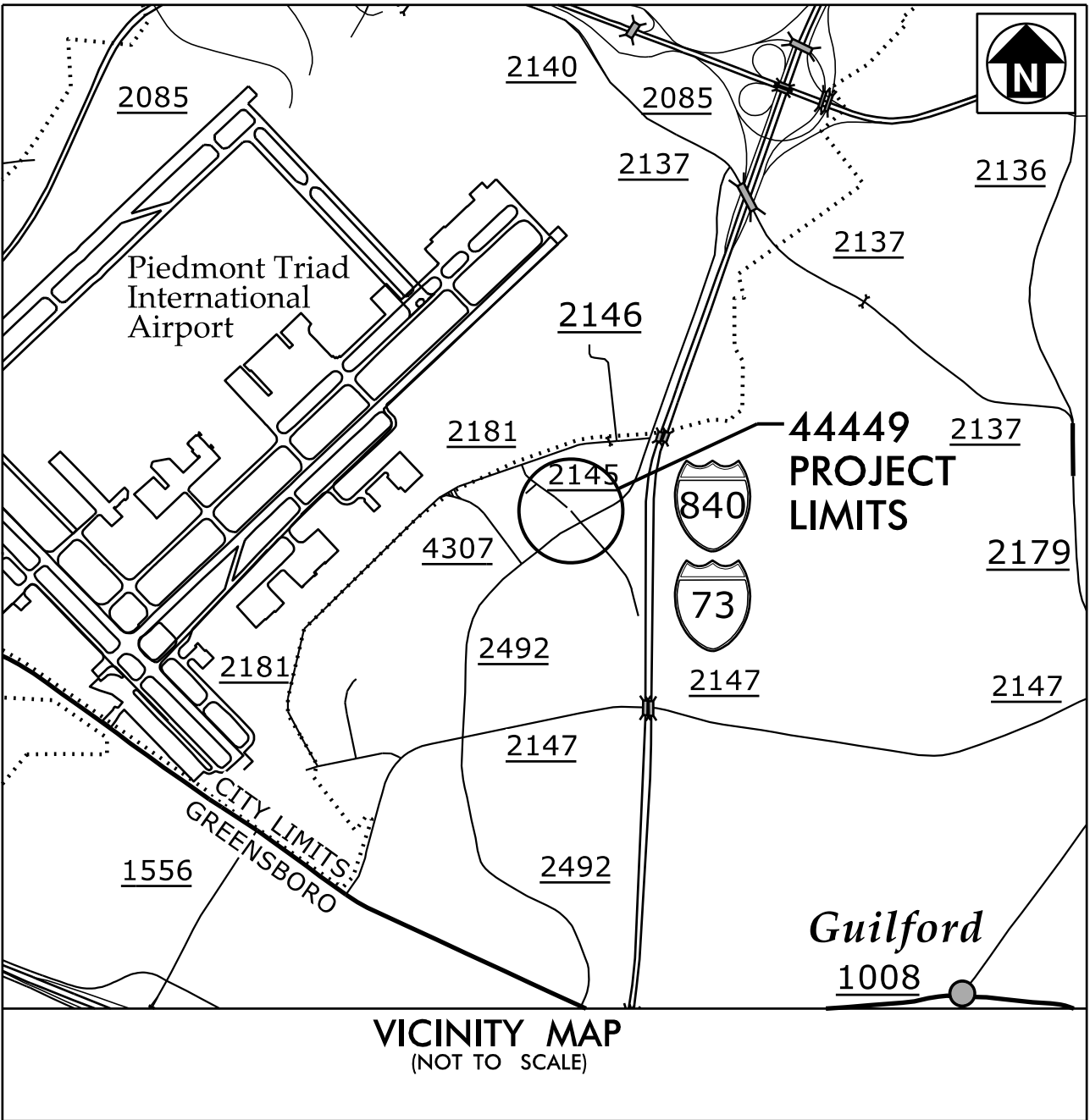


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Ph:156855

TIP PROJECT: 44449

CONTRACT:

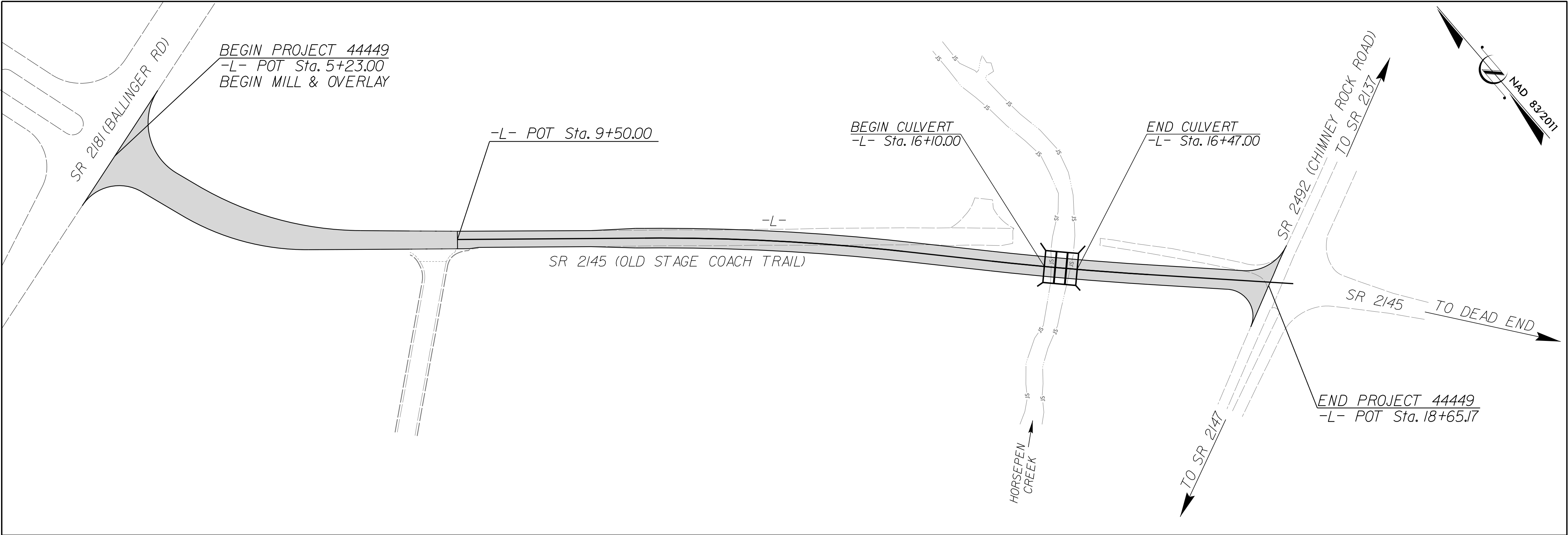


STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
GUILFORD COUNTY

LOCATION: BRIDGE NO.96 OVER HORSEPEN CREEK ON SR 2145 (OLD STAGE COACH TRAIL)

TYPE OF WORK: GRADING, PAVING, DRAINAGE AND CULVERT

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	44449	1	
STATE PROJECT NO.	F.A.PROJ.NO.	DESCRIPTION	



DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES



PLANS



PROFILE (HORIZONTAL)



PROFILE (VERTICAL)

DESIGN DATA

ADT 2015 = N/A

V = 40 MPH

SUB REGIONAL TIER
LOCAL

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT = 0.247 MILES

LENGTH STRUCTURE TIP PROJECT = 0.007 MILES

TOTAL LENGTH TIP PROJECT = 0.254 MILES

Prepared In the Office of Hatch Mott MacDonald for

DIVISION 7

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2012 STANDARD SPECIFICATIONS

LETTING DATE:

OCTOBER 2016

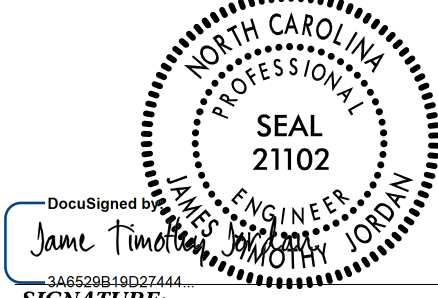
NCDOT CONTACT:

TIM JORDAN, PE
PROJECT ENGINEER

CHRISTOPHER LEWIS, PE
HYDRAULICS ENGINEER

CHRIS SMITHERMAN, PE
DIVISION BRIDGE
PROGRAM MANAGER

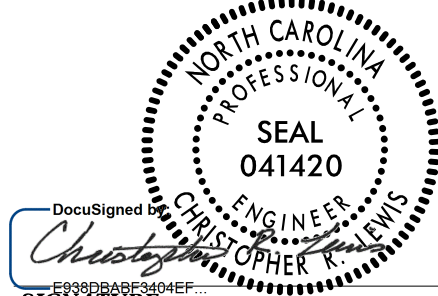
ROADWAY DESIGN ENGINEER



DocuSigned by
James Tim Jordan
SIGNATURE:

9/22/2016
P.E.

HYDRAULICS ENGINEER



DocuSigned by
Christopher Lewis
SIGNATURE:

9/22/2016
P.E.

PLANS PREPARED BY:

M
MOTT
MACDONALD

PO Box 700
Fuquay-Varina, NC 27526
(919) 552-2253
(919) 552-2254 (Fax)
www.mottmac.com

LICENSE NO. F-0669

GENERAL NOTES:

2012 SPECIFICATIONS
EFFECTIVE: 01-17-12
REVISED: 10-31-14

GRADE LINE:
GRADING AND SURFACING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. GRADE LINES MAY BE ADJUSTED AT THEIR BEGINNING AND ENDING AND AT STRUCTURES AS DIRECTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.

CLEARING:

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.

SUPERELEVATION:

ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NO. 225.04 USING THE RATE OF SUPERELEVATION AND RUNOFF SHOWN ON THE PLANS. SUPERELEVATION IS TO BE REVOLVED ABOUT THE GRADE POINTS SHOWN ON THE TYPICAL SECTIONS.

SHOULDER CONSTRUCTION:

ASPHALT, EARTH, AND CONCRETE SHOULDER CONSTRUCTION ON THE HIGH SIDE OF SUPERELEVATED CURVES SHALL BE IN ACCORDANCE WITH STD. NO. 560.01.

GUARDRAIL:

THE GUARDRAIL LOCATIONS SHOWN ON THE PLANS MAY BE ADJUSTED DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHOULD CONSULT WITH THE ENGINEER PRIOR TO ORDERING GUARDRAIL MATERIAL.

SUBSURFACE PLANS:

NO SUBSURFACE PLANS ARE AVAILABLE ON THIS PROJECT. THE CONTRACTOR SHOULD MAKE HIS OWN INVESTIGATION AS TO THE SUBSURFACE CONDITIONS.

RIGHT-OF-WAY MARKERS:

ALL RIGHT-OF-WAY MARKERS ON THIS PROJECT SHALL BE PLACED BY OTHERS.

INDEX OF SHEETS

SHEET NUMBER

DESCRIPTION

1

TITLE SHEET

1-A

INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS

1-B

CONVENTIONAL SYMBOLS

2

PAVEMENT SCHEDULE AND TYPICAL SECTIONS

4

PLAN SHEET AND PROFILE SHEET

TMP-1 THRU TMP-2

TRAFFIC MANAGEMENT PLANS

EC-1 THRU EC-5

EROSION CONTROL PLANS

RF-1

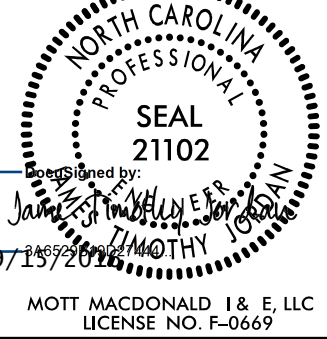

REFORESTATION PLAN

X-1 THRU X-4

CROSS-SECTIONS

C-1 THRU C-6

CULVERT PLANS

PROJECT REFERENCE		SHEET NO.	
44449 - GUILFORD 96		1-A	
ROADWAY DESIGN ENGINEER			
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			
Prepared in the Office of:			
		PO. Box 700 Fuquay-Varina, NC 27526 www.mottmac.com	

EFF: 01-17-12
REV: 02-29-2016

2012 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated January, 2012 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO. TITLE

DIVISION 2 - EARTHWORK
200.02 Method of Clearing - Method II
225.02 Guide for Grading Subgrade - Secondary and Local
225.04 Method of Obtaining Superelevation - Two Lane Pavement

DIVISION 3 - PIPE CULVERTS
300.01 Method of Pipe Installation
310.10 Driveway Pipe Construction

DIVISION 5 - SUBGRADE, BASES AND SHOULDERS
560.01 Method of Shoulder Construction - High Side of Superelevated Curve - Method I

DIVISION 8 - INCIDENTALS
840.54 Manhole Frame and Cover
862.01 Guardrail Placement
862.02 Guardrail Installation
876.01 Rip Rap in Channels
876.02 Guide for Rip Rap at Pipe Outlets
876.04 Drainage Ditches with Class 'B' Rip Rap

Note: Not to Scale

****S.U.E. = Subsurface Utility Engineering***

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

PROJECT REFERENCE	SHEET NO.
44449 - GUILFORD 96	1-B

BOUNDARIES AND PROPERTY:

State Line	-----
County Line	-----
Township Line	-----
City Line	-----
Reservation Line	- . - . - .
Property Line	-----
Existing Iron Pin	○ EIP
Property Corner	-----X
Property Monument	□ ECM
Parcel/Sequence Number	(23)
Existing Fence Line	-X-X-X-
Proposed Woven Wire Fence	○
Proposed Chain Link Fence	□
Proposed Barbed Wire Fence	◇
Existing Wetland Boundary	---WLB---
Proposed Wetland Boundary	---WLB---
Existing Endangered Animal Boundary	---EAB---
Existing Endangered Plant Boundary	---EPB---
Known Soil Contamination: Area or Site	☠ ☠
Potential Soil Contamination: Area or Site	☹ ☹

BUILDINGS AND OTHER CULTURE:

Gas Pump Vent or U/G Tank Cap	○
Sign	○ S
Well	○ W
Small Mine	✕
Foundation	▭
Area Outline	▭
Cemetery	▭ +
Building	▭
School	▭
Church	▭
Dam	▭

HYDROLOGY:

Stream or Body of Water	~~~~~
Hydro, Pool or Reservoir	▭
Jurisdictional Stream	---JS---
Buffer Zone 1	---BZ 1---
Buffer Zone 2	---BZ 2---
Flow Arrow	←
Disappearing Stream	➤
Spring	○
Wetland	⚡
Proposed Lateral, Tail, Head Ditch	➤
False Sump	←FLOW

RAILROADS:

Standard Gauge	+++++
RR Signal Milepost	○ MILEPOST 35
Switch	▭ SWITCH
RR Abandoned	++
RR Dismantled	-----

RIGHT OF WAY:

Baseline Control Point	△
Existing Right of Way Marker	△
Existing Right of Way Line	-----
Proposed Right of Way Line	⊙ R W
Proposed Right of Way Line with Iron Pin and Cap Marker	⊙ R W
Proposed Right of Way Line with Concrete or Granite R/W Marker	⊙ R W
Proposed Control of Access Line with Concrete C/A Marker	⊙ C A
Existing Control of Access	⊙ C A
Proposed Control of Access	⊙ C A
Existing Easement Line	---E---
Proposed Temporary Construction Easement	---E---
Proposed Temporary Drainage Easement	---TDE---
Proposed Permanent Drainage Easement	---PDE---
Proposed Permanent Drainage /Utility Easement	---DUE---
Proposed Permanent Utility Easement	---PUE---
Proposed Temporary Utility Easement	---TUE---
Proposed Aerial Utility Easement	---AUE---

Proposed Permanent Easement with Iron Pin and Cap Marker	◆
----------------------------------------------------------	---

ROADS AND RELATED FEATURES:

Existing Edge of Pavement	-----
Existing Curb	-----
Proposed Slope Stakes Cut	---C---
Proposed Slope Stakes Fill	---F---
Proposed Curb Ramp	⊙ CR
Existing Metal Guardrail	---T---
Proposed Guardrail	---T---
Existing Cable Guiderail	---T---
Proposed Cable Guiderail	---T---
Equality Symbol	⊙
Pavement Removal	▭
<i>VEGETATION:</i>	
Single Tree	☼
Single Shrub	☼
Hedge	~~~~~
Woods Line	~~~~~

Orchard	☼ ☼ ☼ ☼
Vineyard	▭ Vineyard

EXISTING STRUCTURES:

MAJOR:	
Bridge, Tunnel or Box Culvert	▭ CONC
Bridge Wing Wall, Head Wall and End Wall	⌋ CONC WW ⌋
MINOR:	
Head and End Wall	▭ CONC HW
Pipe Culvert	-----
Footbridge	➤-----➤
Drainage Box: Catch Basin, DI or JB	▭ CB
Paved Ditch Gutter	-----
Storm Sewer Manhole	⊙ S
Storm Sewer	---S---

UTILITIES:

POWER:	
Existing Power Pole	●
Proposed Power Pole	●
Existing Joint Use Pole	●
Proposed Joint Use Pole	⊙
Power Manhole	⊙
Power Line Tower	⊗
Power Transformer	⊗
U/G Power Cable Hand Hole	⊙
H-Frame Pole	●●
Recorded U/G Power Line	---P---
Designated U/G Power Line (S.U.E.*)	---P---

TELEPHONE:

Existing Telephone Pole	●
Proposed Telephone Pole	●
Telephone Manhole	⊙
Telephone Booth	⊙
Telephone Pedestal	⊙
Telephone Cell Tower	⊙
U/G Telephone Cable Hand Hole	⊙
Recorded U/G Telephone Cable	---T---
Designated U/G Telephone Cable (S.U.E.*)	---T---
Recorded U/G Telephone Conduit	---TC---
Designated U/G Telephone Conduit (S.U.E.*)	---TC---
Recorded U/G Fiber Optics Cable	---T FO---
Designated U/G Fiber Optics Cable (S.U.E.*)	---T FO---

WATER:

Water Manhole	⊙ W
Water Meter	⊙
Water Valve	⊗
Water Hydrant	⊙
Recorded U/G Water Line	---W---
Designated U/G Water Line (S.U.E.*)	---W---
Above Ground Water Line	---A/G Water---

TV:

TV Satellite Dish	☼
TV Pedestal	⊙
TV Tower	⊗
U/G TV Cable Hand Hole	⊙
Recorded U/G TV Cable	---TV---
Designated U/G TV Cable (S.U.E.*)	---TV---
Recorded U/G Fiber Optic Cable	---TV FO---
Designated U/G Fiber Optic Cable (S.U.E.*)	---TV FO---

GAS:

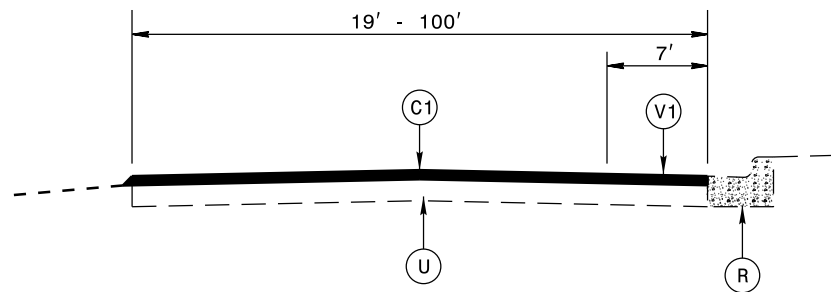
Gas Valve	◇
Gas Meter	⊙
Recorded U/G Gas Line	---G---
Designated U/G Gas Line (S.U.E.*)	---G---
Above Ground Gas Line	---A/G Gas---

SANITARY SEWER:

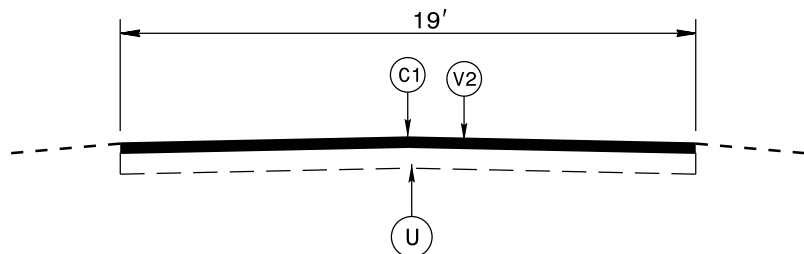
Sanitary Sewer Manhole	⊙
Sanitary Sewer Cleanout	⊙
U/G Sanitary Sewer Line	---SS---
Above Ground Sanitary Sewer	---A/G Sanitary Sewer---
Recorded SS Forced Main Line	---FSS---
Designated SS Forced Main Line (S.U.E.*)	---FSS---

MISCELLANEOUS:

Utility Pole	●
Utility Pole with Base	▭
Utility Located Object	○
Utility Traffic Signal Box	⊙
Utility Unknown U/G Line	---2UTL---
U/G Tank; Water, Gas, Oil	▭
Underground Storage Tank, Approx. Loc.	⊙
A/G Tank; Water, Gas, Oil	▭
Geoenvironmental Boring	⊙
U/G Test Hole (S.U.E.*)	⊙
Abandoned According to Utility Records	AATUR
End of Information	E.O.I.

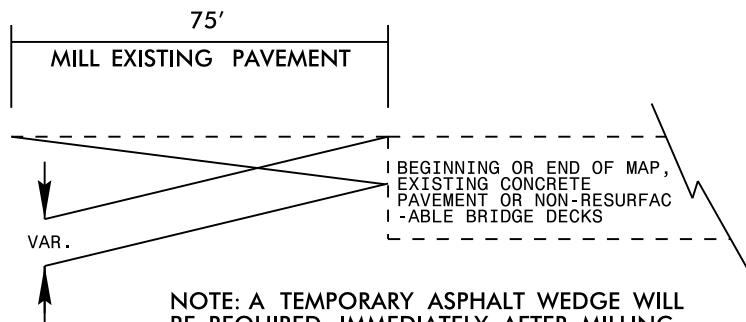


TYPICAL SECTION NO. 1
FROM 05+23 to Sta. 9+50

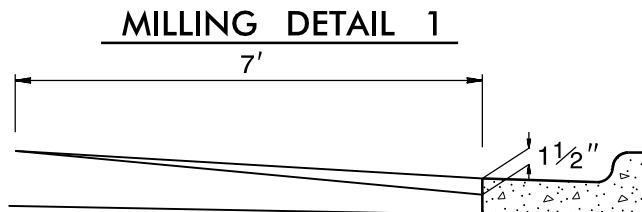


TYPICAL SECTION NO. 2
FROM 9+50 to Sta. 11+00

INCIDENTAL MILLING DETAIL 1

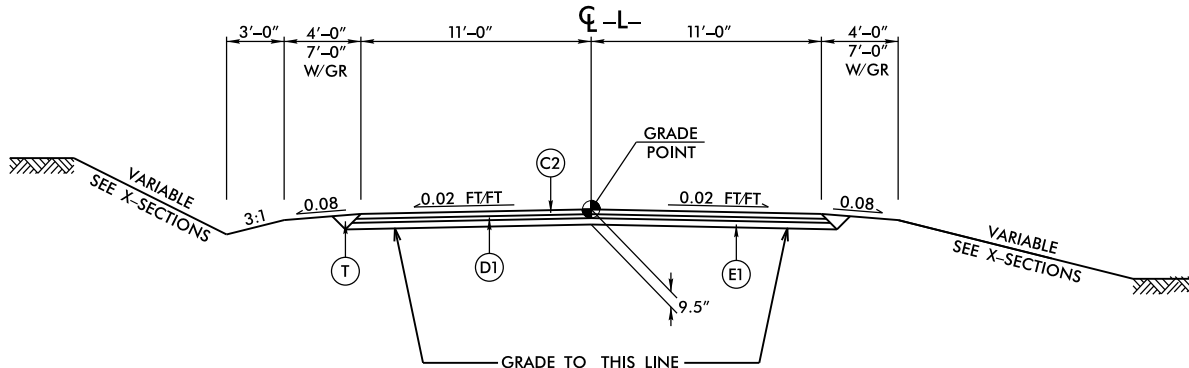


NOTE: A TEMPORARY ASPHALT WEDGE WILL BE REQUIRED IMMEDIATELY AFTER MILLING TO ENSURE SMOOTH TRAVEL IF THE FINAL LAYER OF SURFACE COURSE IS NOT PLACED PRIOR TO OPENING THE LANE TO TRAFFIC.



MILL EXISTING ASPHALT PAVEMENT 0-1 1/2" AT LOCATIONS AS DIRECTED BY THE ENGINEER

NOTE:
TO BE USED IN CONJUNCTION WITH TS. NO. 1



TYPICAL SECTION NO. 3

USE TYPICAL SECTION NO. 1:

PROFILE MILL 0 - 1.5" 7' WIDTH ALONG C&G AND OVERLAY EXISTING PAVEMENT WITH C1:

-L- STA 5+23 TO 9+50

USE TYPICAL SECTION NO. 2:

MILL 1.5" AND OVERLAY EXISTING PAVEMENT WITH C1:

-L- STA 9+50 TO 11+00

TRANSITION FROM EXISTING TO TYPICAL SECTION NO. 1:

-L- STA 11+00.00 TO 11+50.00

USE TYPICAL SECTION NO. 3:

-L- STA 11+50.00 TO 18+15.00

TRANSITION FROM TYPICAL SECTION NO. 3 TO EXISTING:

-L- STA 18+15.00 TO 18+65.17 (INTERSECTION)

NOTE:
CULVERT SHALL BE CAST INPLACE, PRE-CAST CULVERTS WILL NOT BE ALLOWED.

PAVEMENT SCHEDULE			
C1	PROP. APPROX. 1 1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.		
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.		
D1	PROP. APPROX. 2 1/2" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.		
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.		
T	EARTH MATERIAL.	V1	MILLING BITUMINOUS PAVEMENT, 0 - 1 1/2" DEPTH
V2	MILLING BITUMINOUS PAVEMENT, 1 1/2" DEPTH		

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

GENERAL NOTES

CHANGES MAY BE REQUIRED WHEN PHYSICAL DIMENSIONS IN THE DETAIL DRAWINGS, STANDARD DETAILS, AND ROADWAY DETAILS ARE NOT ATTAINABLE TO MEET FIELD CONDITIONS OR RESULT IN DUPLICATE OR UNDESIRED OVERLAPPING OF DEVICES. MODIFICATION MAY INCLUDE: MOVING, SUPPLEMENTING, COVERING, OR REMOVAL OF DEVICES AS DIRECTED BY THE ENGINEER.

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT EXCEPT WHEN OTHERWISE NOTED IN THE PLAN OR DIRECTED BY THE ENGINEER.

LANE AND SHOULDER CLOSURE REQUIREMENTS

- A) REMOVE LANE CLOSURE DEVICES FROM THE LANE WHEN WORK IS NOT BEING PERFORMED BEHIND THE LANE CLOSURE OR WHEN A LANE CLOSURE IS NO LONGER NEEDED OR AS DIRECTED BY THE ENGINEER.
- B) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN 15 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN SHOULDER USING ROADWAY STANDARD DRAWING NO. 1101.04 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL OR A LANE CLOSURE IS INSTALLED.
- C) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING ON THE SHOULDER ADJACENT TO AN UNDIVIDED FACILITY AND WITHIN 5 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN TRAVEL LANE USING ROADWAY STANDARD DRAWING NO. 1101.02 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL.
- D) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN A LANE OF TRAVEL OF AN UNDIVIDED OR DIVIDED FACILITY, CLOSE THE LANE ACCORDING TO THE TRAFFIC CONTROL PLANS, ROADWAY STANDARD DRAWINGS, OR AS DIRECTED BY THE ENGINEER. CONDUCT THE WORK SO THAT ALL PERSONNEL AND/OR EQUIPMENT REMAIN WITHIN THE CLOSED TRAVEL LANE.
- E) PROVIDE TRAFFIC CONTROL FOR APPROPRIATE LANE CLOSURES FOR SURVEYING DONE BY THE DEPARTMENT.

TRAFFIC PATTERN ALTERATIONS

- F) NOTIFY THE ENGINEER TWENTY ONE (21) CALENDAR DAYS PRIOR TO ANY TRAFFIC PATTERN ALTERATION.

SIGNING

- G) INSTALL ADVANCE WORK ZONE WARNING SIGNS WHEN WORK IS WITHIN 40 FT FROM THE EDGE OF TRAVEL LANE AND NO MORE THAN THREE (3) DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.
- J) PROVIDE PERMANENT SIGNING.
- K) PROVIDE SIGNING AND DEVICES REQUIRED TO CLOSE THE ROAD ACCORDING TO THE ROADWAY STANDARD DRAWINGS AND TRAFFIC CONTROL PLANS.
- L) COVER OR REMOVE ALL SIGNS AND DEVICES REQUIRED TO CLOSE THE ROAD WHEN ROAD CLOSURE IS NOT IN OPERATION.
- M) ENSURE ALL NECESSARY SIGNING IS IN PLACE PRIOR TO ALTERING ANY TRAFFIC PATTERN.

TRAFFIC CONTROL DEVICES

- H) WHEN LANE CLOSURES ARE NOT IN EFFECT SPACE CHANNELIZING DEVICES IN WORK AREAS NO GREATER IN FEET THAN TWICE THE POSTED SPEED LIMIT (MPH) EXCEPT, 10 FT ON-CENTER IN RADII, AND 3 FT OFF THE EDGE OF AN OPEN TRAVELWAY. REFER TO STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES SECTIONS 1130 (DRUMS), 1135 (CONES) AND 1180 (SKINNY DRUMS) FOR ADDITIONAL REQUIREMENTS.
- I) PLACE TYPE III BARRICADES, WITH "ROAD CLOSED" SIGN R11-2 ATTACHED, OF SUFFICIENT LENGTH TO CLOSE ENTIRE ROADWAY.

- N) WHEN LANE CLOSURES ARE NOT IN EFFECT SPACE CHANNELIZING DEVICES IN WORK AREAS NO GREATER IN FEET THAN TWICE THE POSTED SPEED LIMIT (MPH) EXCEPT, 10 FT ON-CENTER IN RADII, AND 3 FT OFF THE EDGE OF AN OPEN TRAVELWAY. REFER TO STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES SECTIONS 1130 (DRUMS), 1135 (CONES) AND 1180 (SKINNY DRUMS) FOR ADDITIONAL REQUIREMENTS.

PAVEMENT MARKINGS AND MARKERS

- O) INSTALL PAVEMENT MARKINGS ON THE FINAL SURFACE.
- P) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.




STANDARDS

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" – HIGHWAY DESIGN BRANCH– N.C. DEPARTMENT OF TRANSPORTATION – RALEIGH, N.C., DATED JANUARY 2012 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD.	TITLE
1101.02	TEMPORARY LANE CLOSURES
1101.03	TEMPORARY ROAD CLOSURES
1101.04	TEMPORARY SHOULDER CLOSURES
1110.01	STATIONARY WORK ZONE SIGNS
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.02	PORTABLE WORK ZONE SIGNS
1130.01	DRUM
1135.01	CONES
1145.01	BARRICADES
1150.01	FLAGGING DEVICES
1180.01	SKINNY–DRUM
1205.01	PAVEMENT MARKINGS – LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS – TWO–LANE AND MULTI–LANE ROADWAYS
1261.01	GUARDRAIL AND BARRIER DELINEATORS – INSTALLATION SPACING
1261.02	GUARDRAIL AND BARRIER DELINEATORS – TYPES AND MOUNTING
1262.01	GUARDRAIL END DELINEATION

PHASING

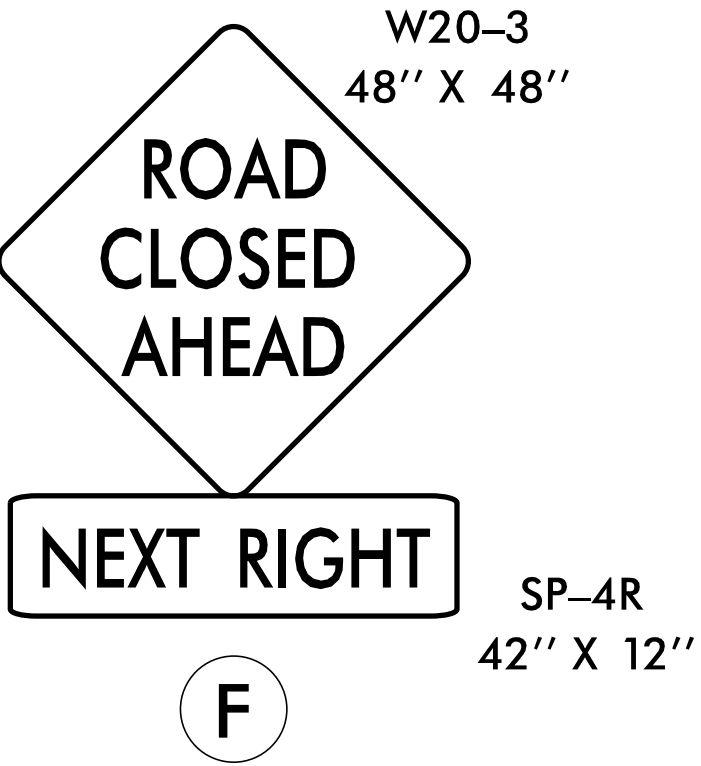
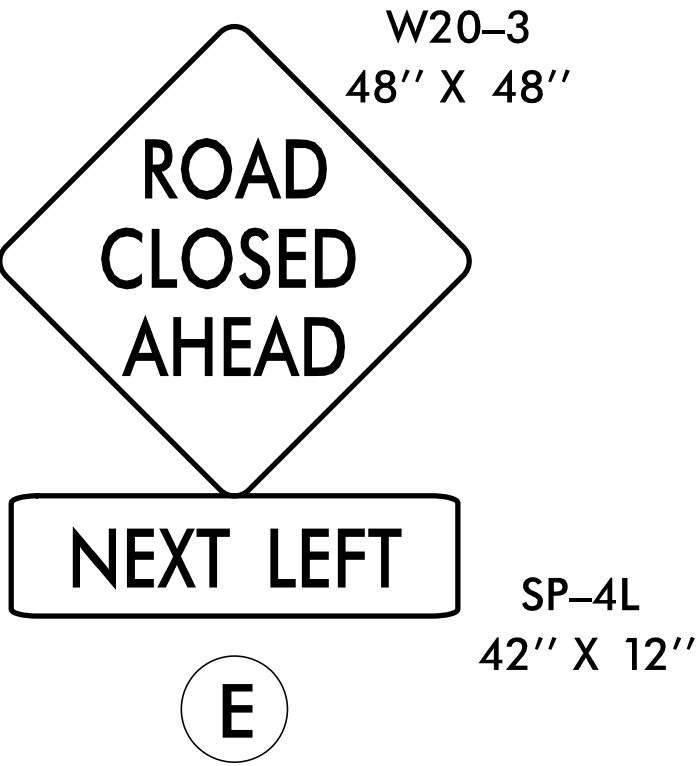
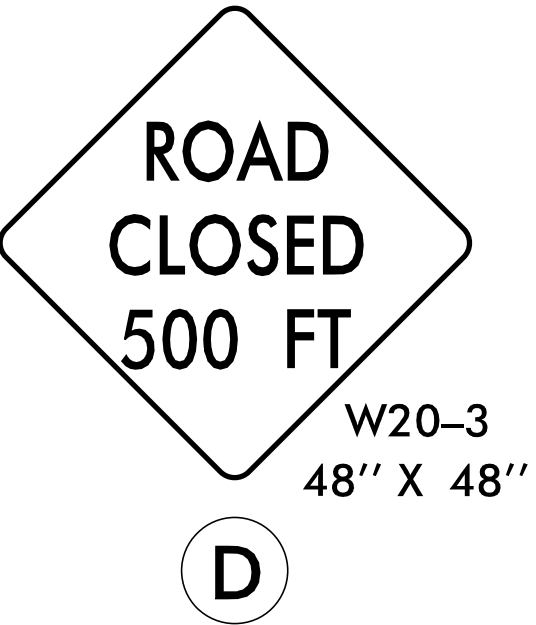
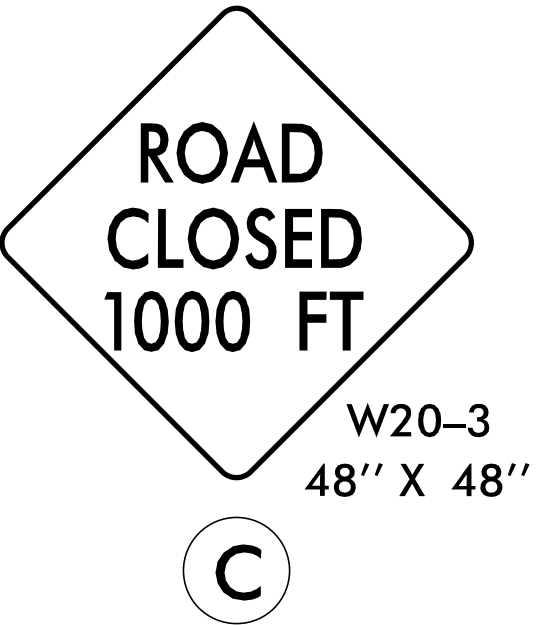
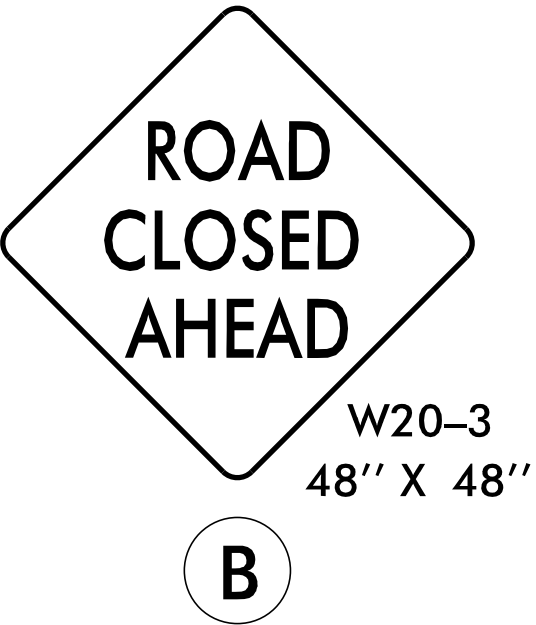
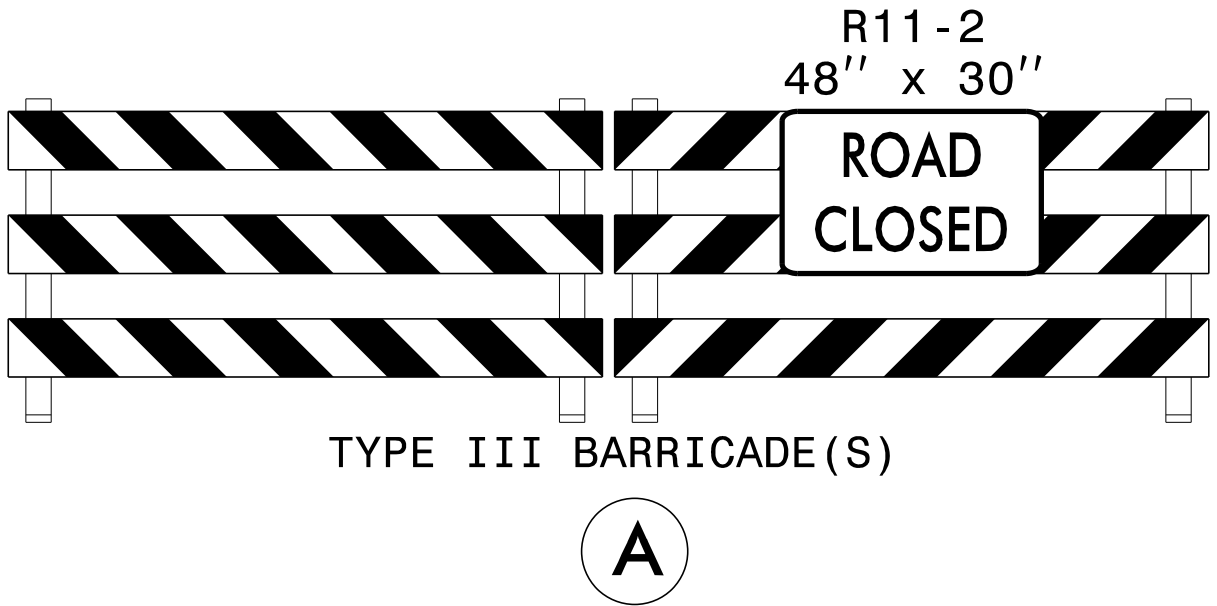
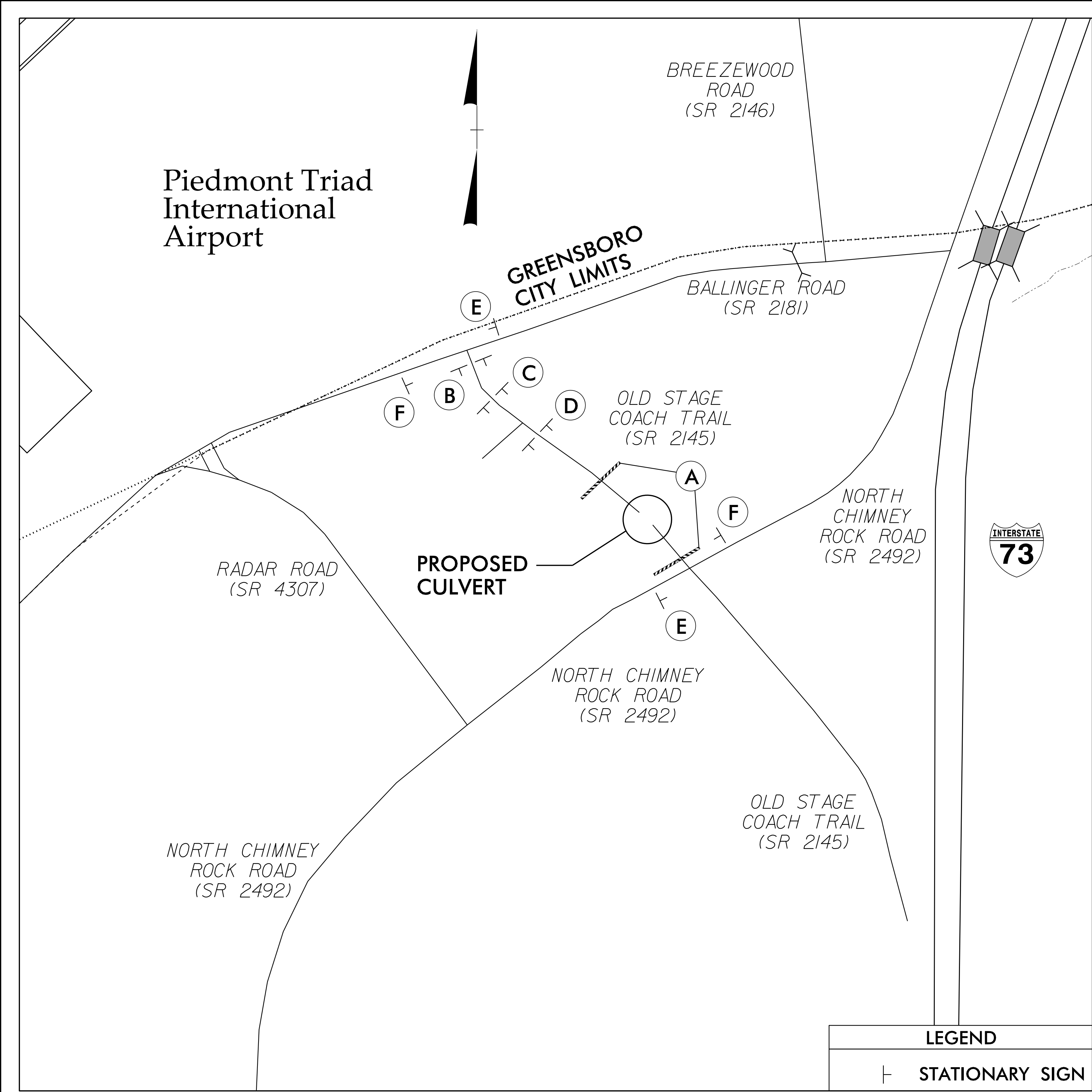
- STEP 1: USING ROADWAY STANDARD DRAWING NUMBER 1101.03, SHEET 1 OF 9, AND SHEET TMP-2, PERFORM THE FOLLOWING:
– INSTALL ALL ROAD CLOSURE SIGNING INCLUDING BARRICADES
– CLOSE SR 2145 (OLD STAGE COACH TRAIL)
- STEP 2: CONSTRUCT THE PROPOSED CULVERT AND APPROACHES AS SHOWN IN THE CONSTRUCTION PLANS.
- STEP 3: USING ROADWAY STANDARD DRAWING NUMBER 1101.02, SHEET 1 OF 15, PERFORM THE FOLLOWING:
– COMPLETE THE TIE IN WITH SR 2492 (NORTH CHIMNEY ROCK ROAD)
- STEP 4: INSTALL FINAL PAVEMENT MARKINGS.
- STEP 5: REMOVE ALL TRAFFIC CONTROL SIGNING AND DEVICES AND RE-OPEN SR 2145 (OLD STAGE COACH TRAIL) TO THE FINAL TRAFFIC PATTERN.


PROJECT REFERENCE		SHEET NO.	
44449 – GUILFORD 96		TMP-1	
ROADWAY DESIGN ENGINEER			
			
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			
Prepared in the Office of:		  P.O. Box 700 Fuquay-Varina, NC 27526 www.mottmac.com	

PAVEMENT MARKING

PAINT WHITE EDGELINE (4") 3,660 LF
PAINT YELLOW DOUBLE CENTER (4") 3,660 LF

NOTE: QUANTITY INCLUDES 2 APPLICATIONS OF EACH



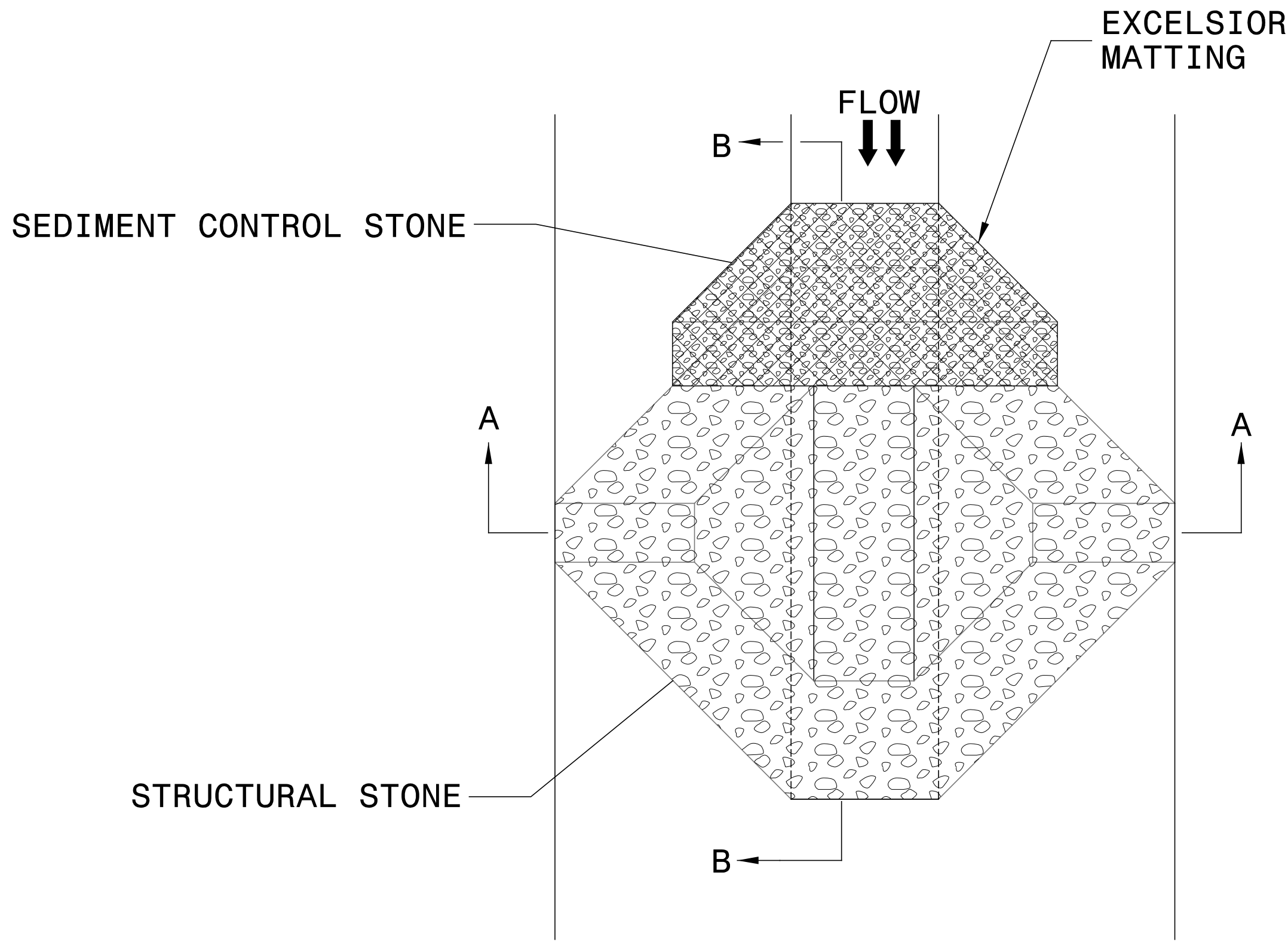
PROJECT REFERENCE		SHEET NO.
44449 -- GUILFORD 96		TMP-2
ROADWAY DESIGN ENGINEER		
<div>Seal of the State of North Carolina Professional Engineer TIMOTHY J. MACDONALD 21102 9/15/2016</div>		
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		
Prepared in the Office of:	MOTT MACDONALD	
	PO Box 700 Furquay-Yarima, NC 27526 www.mottmac.com	

8/22/2016
BIM\6.2 Work In Progress\Hydraulics\Erosion Control\cadd\400096_hyd-erosion_tsh.dgn
TCA ENGINEERING, INC.

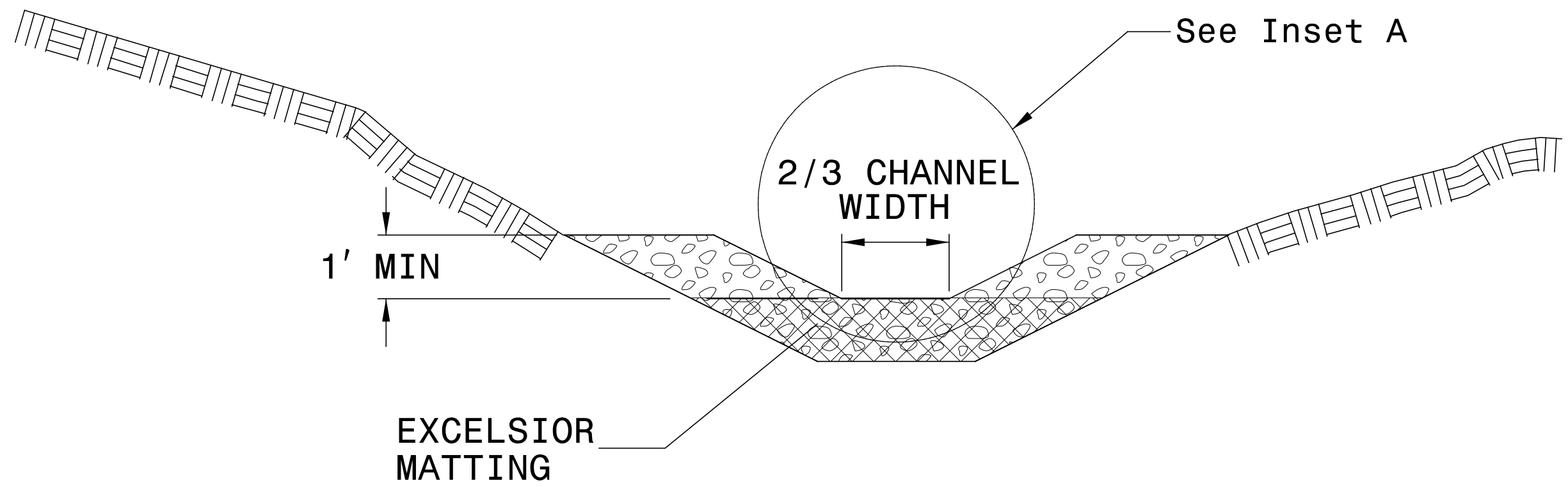
1604.01	Railroad Erosion Control Detail	1632.01	Rock Inlet Sediment Trap Type A
1605.01	Temporary Silt Fence	1632.02	Rock Inlet Sediment Trap Type B
1606.01	Special Sediment Control Fence	1632.03	Rock Inlet Sediment Trap Type C
1607.01	Gravel Construction Entrance	1633.01	Temporary Rock Silt Check Type A
1622.01	Temporary Berms and Slope Drains	1633.02	Temporary Rock Silt Check Type B
1630.01	Riser Basin	1634.01	Temporary Rock Sediment Dam Type A
1630.02	Silt Basin Type B	1634.02	Temporary Rock Sediment Dam Type B
1630.03	Temporary Silt Ditch	1635.01	Rock Pipe Inlet Sediment Trap Type A
1630.04	Stilling Basin	1635.02	Rock Pipe Inlet Sediment Trap Type B
1630.05	Temporary Diversion	1640.01	Coir Fiber Baffle
1630.06	Special Stilling Basin	1645.01	Temporary Stream Crossing
1631.01	Matting Installation		

TEMPORARY ROCK SILT CHECK TYPE 'A' WITH EXCELSIOR MATTING AND POLYACRYLAMIDE (PAM)

PROJECT REFERENCE NO.	SHEET NO.
44449	EC-2
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



PLAN



SECTION A-A

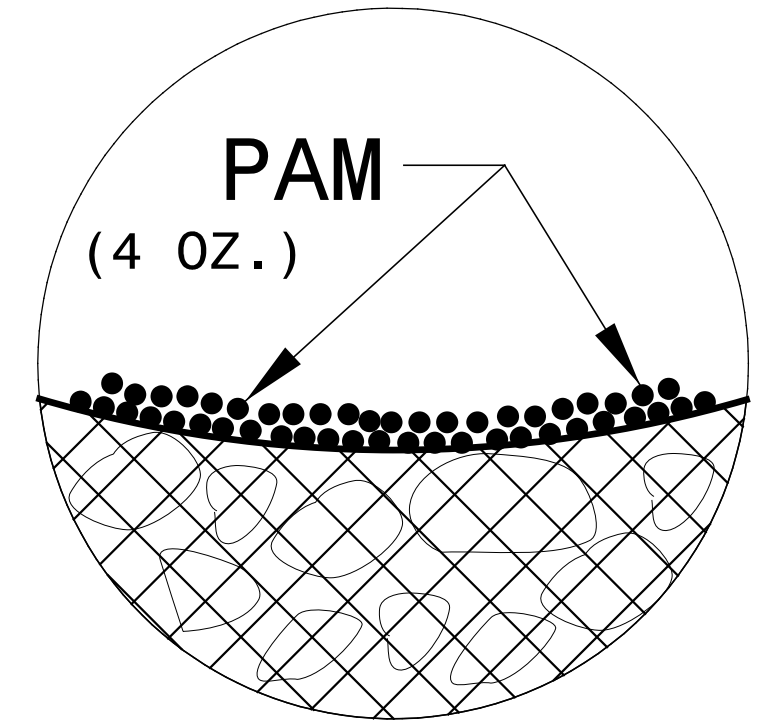
NOTES:

INSTALL TEMPORARY ROCK SILT CHECK TYPE A IN ACCORDANCE WITH ROADWAY STANDARD DRAWING NO. 1633.01.

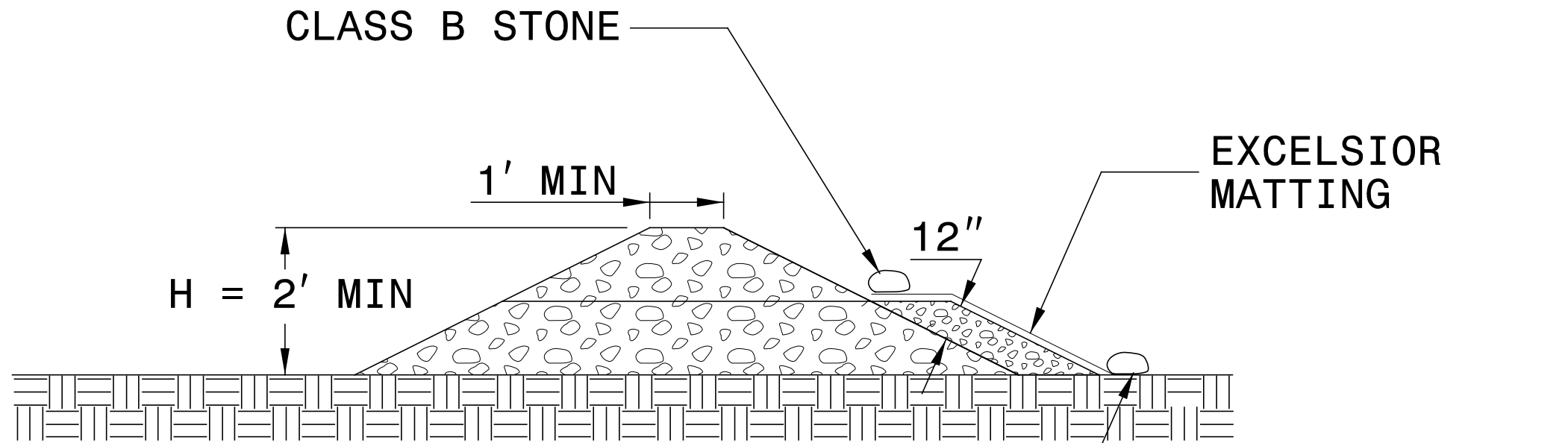
USE EXCELSIOR FOR MATTING MATERIAL AND ANCHOR MATTING SECTION AT TOP AND BOTTOM WITH CLASS B STONE.

PRIOR TO POLYACRYLAMIDE (PAM) APPLICATION, OBTAIN A SOIL SAMPLE FROM PROJECT LOCATION, AND FROM OFFSITE MATERIAL, AND ANALYZE FOR APPROPRIATE PAM FLOCCULANT TO BE APPLIED TO EACH ROCK SILT CHECK.

INITIALLY APPLY 4 OUNCES OF POLYACRYLAMIDE (PAM) TO TOP OF MATTING SECTION AND AFTER EVERY RAINFALL EVENT THAT EQUALS OR EXCEEDS 0.50 INCHES.



INSET A



SECTION B-B

NOT TO SCALE

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

PROJECT REFERENCE NO.	SHEET NO.
44449	EC-3
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

SOIL STABILIZATION SUMMARY SHEET

PERMANENT SOIL REINFORCEMENT MAT

[illegible]

PERMANENT SOIL REINFORCEMENT MAT

[illegible]

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

PROJECT REFERENCE NO.	SHEET NO.
44449	EC-3A
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

SOIL STABILIZATION TIMEFRAMES

SITE DESCRIPTION	STABILIZATION TIME	TIMEFRAME EXCEPTIONS
PERIMETER DIKES, SWALES, DITCHES AND SLOPES	7 DAYS	NONE
HIGH QUALITY WATER (HQW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED.
SLOPES 3:1 OR FLATTER	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH.
ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	NONE, EXCEPT FOR PERIMETERS AND HQW ZONES.

ICA ENGINEERING, INC.
P:\Hydro\DDC\Guilford\096\6.0_CAD_BIM\6.2_Work\In-Progress\Hydraulics\Erosion Control\cadd\400096_hyd_erosion_c&g_psh04.dgn
8/22/2016
\$\$\$\$DATE\$

PROJECT REFERENCE
44449 - GUILFORD 96

SHEET NO.
EC-04/CONST.04

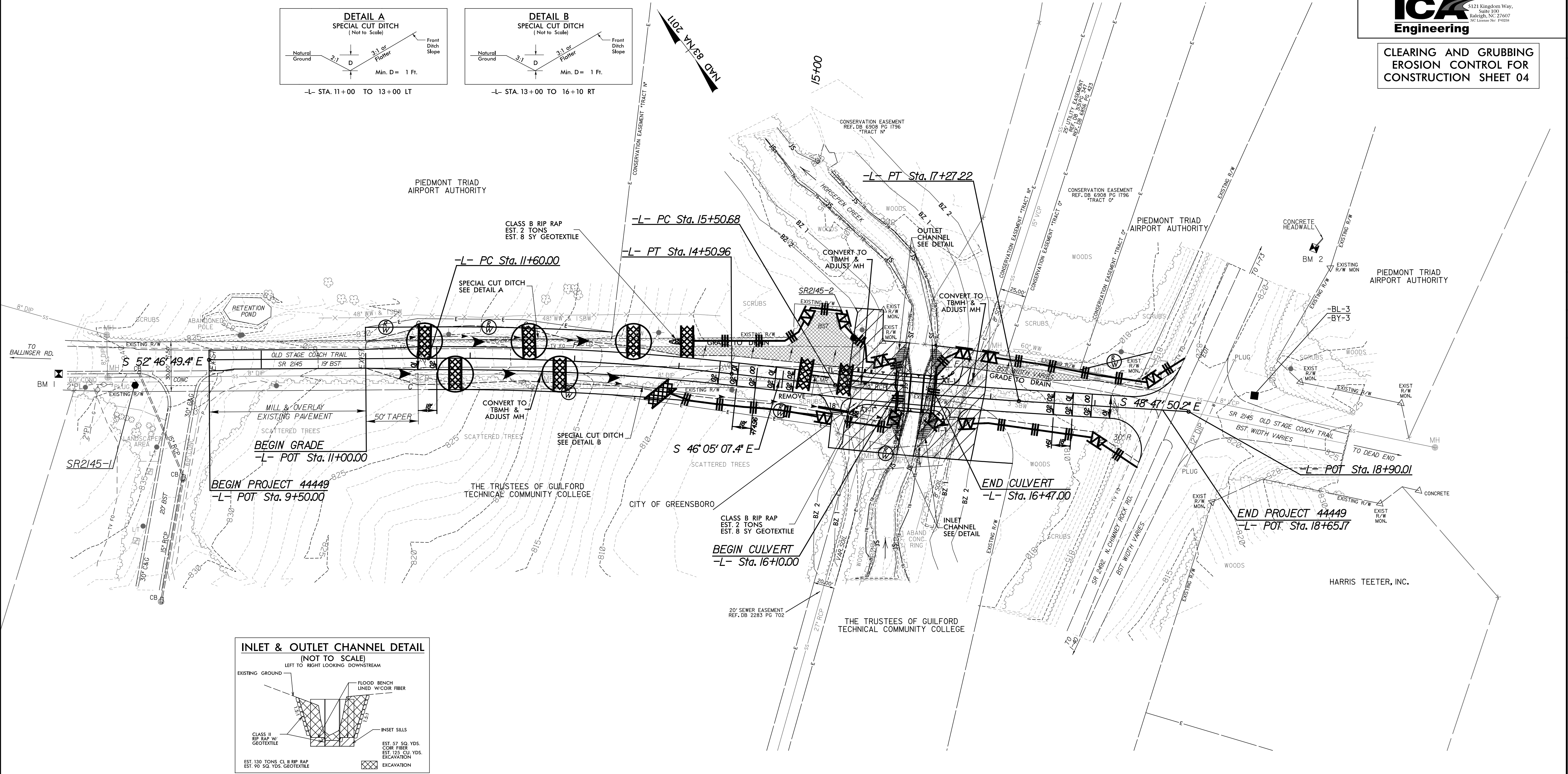
ROADSIDE ENVIRONMENTAL PROJECT ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

ICA
Engineering

5121 Kingdom Way,
Suite 100
Raleigh, NC 27607
919.486.9600

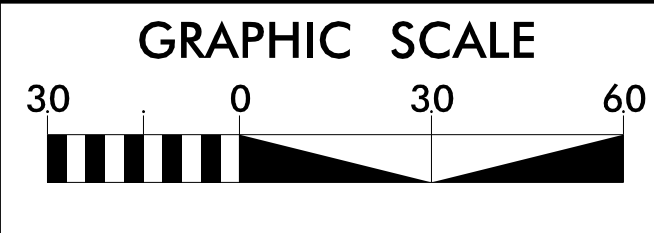
CLEARING AND GRUBBING
EROSION CONTROL FOR
CONSTRUCTION SHEET 04



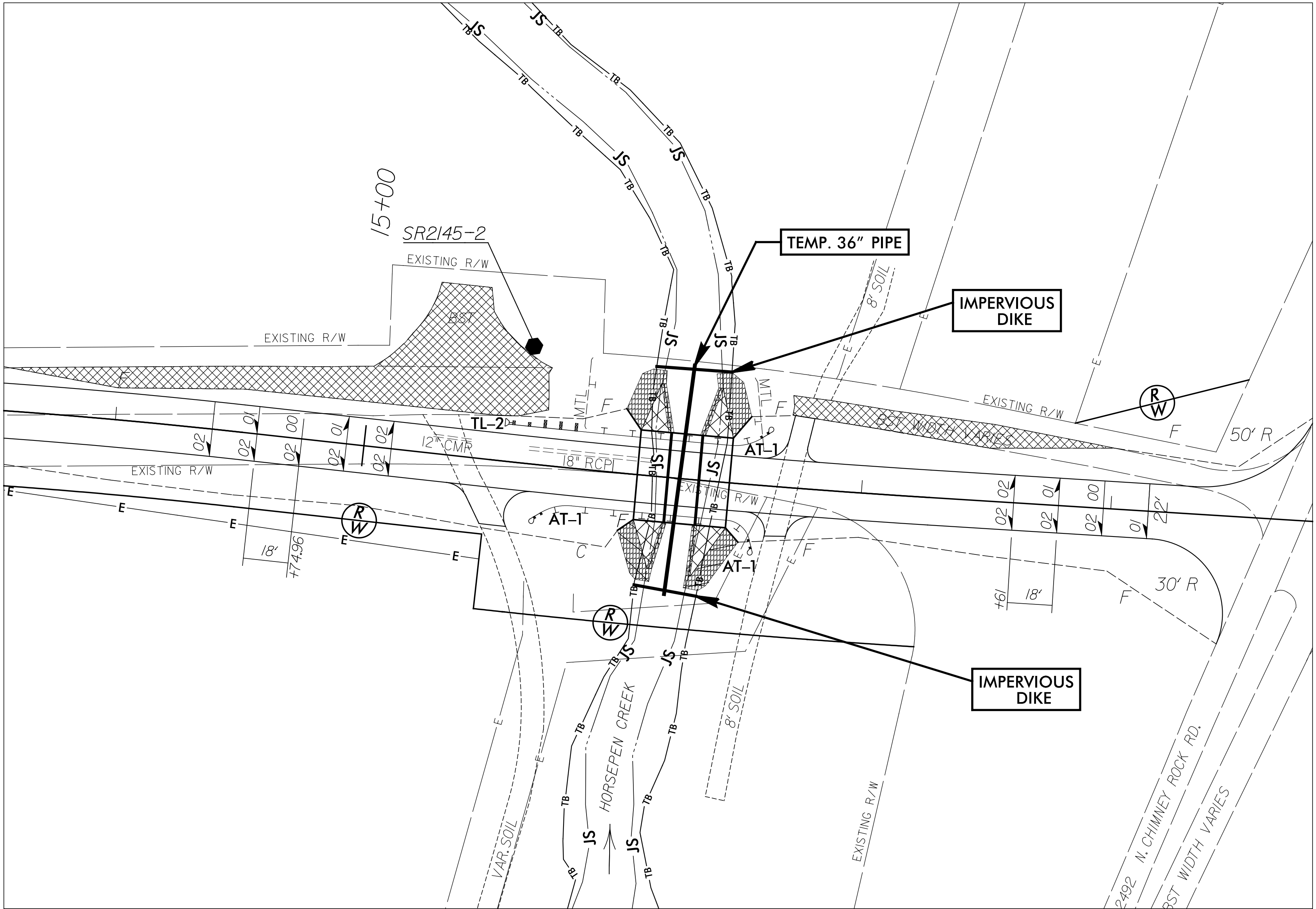
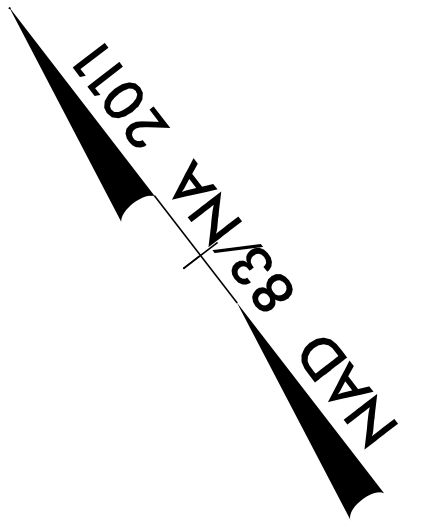
- NOTE:
PLACE TEMPORARY ROCK SEDIMENT DAMS TYPE - B
AND TEMPORARY ROCK SILT CHECKS TYPE - A AT
DRAINAGE OUTLETS.
- NOTE:
PERIMETER EROSION CONTROL MEASURES SHALL BE
INSTALLED DURING CLEARING AND GRUBBING PHASE.
- NOTE:
ALL EROSION CONTROL DEVICES SHOWN ARE
LOCATED WITHIN EXISTING R/W OR EASEMENT.

8/22/2016 8:41:16 AM C:\Users\jgarcia\Documents\Projects\Guilford\096\6.0_CAD\BIM\6.2_Work\In-Progress\Hydraulics\Erosion Control\cadd\400096_hyd_ConstructionSequence.dgn 5/14/99

CONSTRUCTION SEQUENCE



PROJECT REFERENCE NO.	SHEET NO.
44449	EC-4A/CONST.4
RW SHEET NO.	
BRIDGE NO.96 OVER HORESPEN CREEK ON SR 2145 (OLD STAGE COACH TRAIL) GUILFORD COUNTY, NC	



CULVERT PHASING GUILFORD 96

PHASE 1

- 1.) INSTALL ALL TEMPORARY SEDIMENT CONTROL DEVICES NECESSARY FOR CULVERT CONSTRUCTION.
- 2.) INSTALL SPECIAL STILLING BASIN(S) WITHIN PROJECT RIGHT-OF-WAY. PUMP ALL EFFLUENT INTO SPECIAL STILLING BASIN(S).
- 3.) INSTALL IMPERVIOUS DIKES AND INSTALL 36" TEMP. PIPE.
- 4.) DE-WATER EFFLUENT FROM WORK SITE INTO SPECIAL STILLING BASIN.
- 5.) CONSTRUCT PROPOSED 3 @ 12' X 8' RCBC, CHANNEL IMPROVEMENTS AND FLOOD BENCH PER PLANS.

PHASE 2

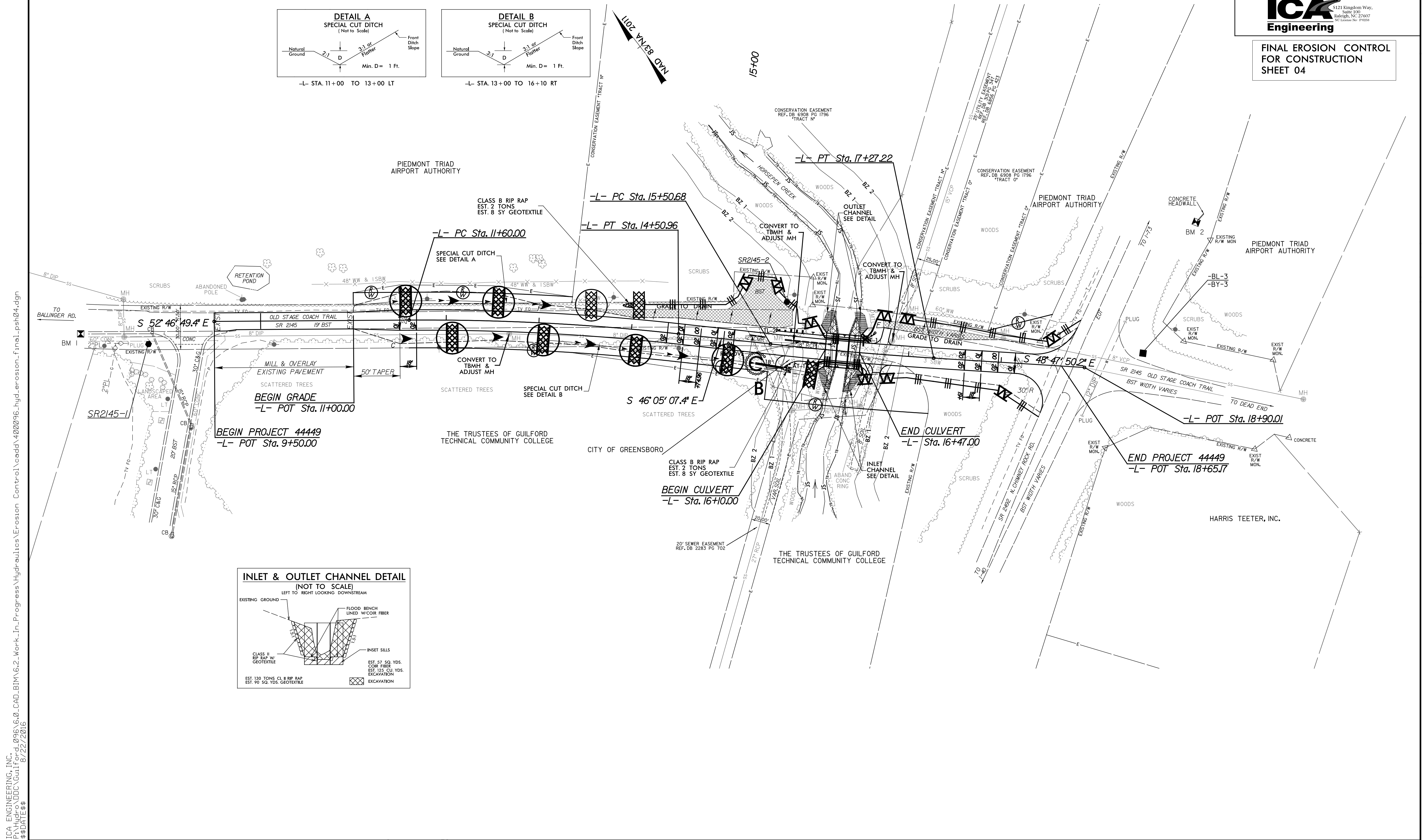
- 6.) REMOVE TEMPORARY IMPERVIOUS DIKES AND TEMPORARY PIPE TO ALLOW FLOW THROUGH NEWLY CONSTRUCTED CULVERT.
- 7.) UPON STABILIZATION OF ALL DISTRUBED AREAS, REMOVE ALL TEMPORARY SEDIMENT CONTROL DEVICES.

PROJECT REFERENCE	SHEET NO.
44449 – GUILFORD 96	EC-05/CONST.04
ROADSIDE ENVIRONMENTAL PROJECT ENGINEER	

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION



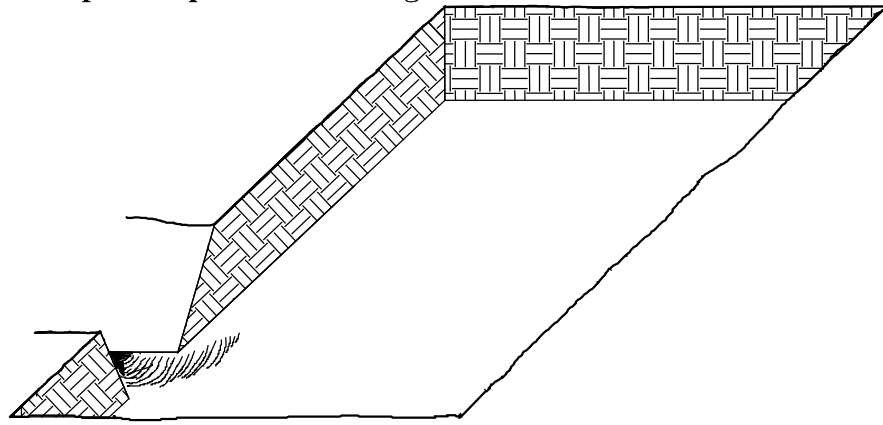
FINAL EROSION CONTROL
FOR CONSTRUCTION
SHEET 04



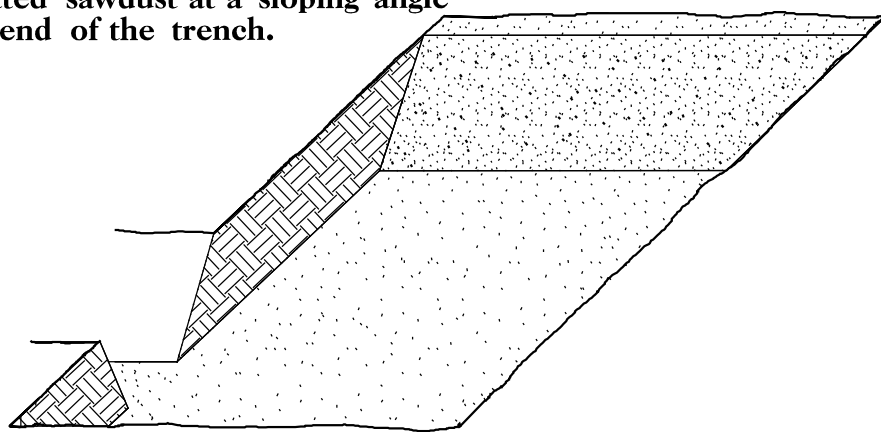
PLANTING DETAILS
SEEDLING / LINER BAREROOT PLANTING DETAIL

HEALING IN

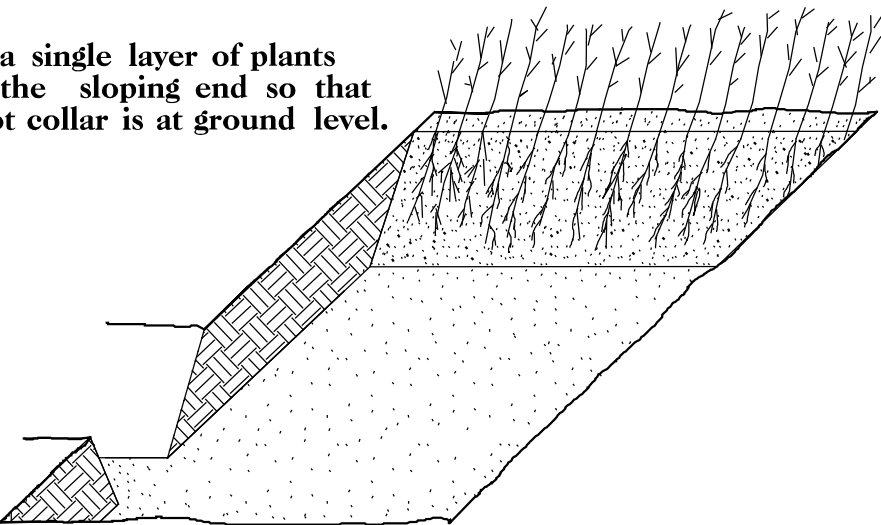
1. Locate a healing-in site in a shady, well protected area.
2. Excavate a flat bottom trench 12 inches deep and provide drainage.



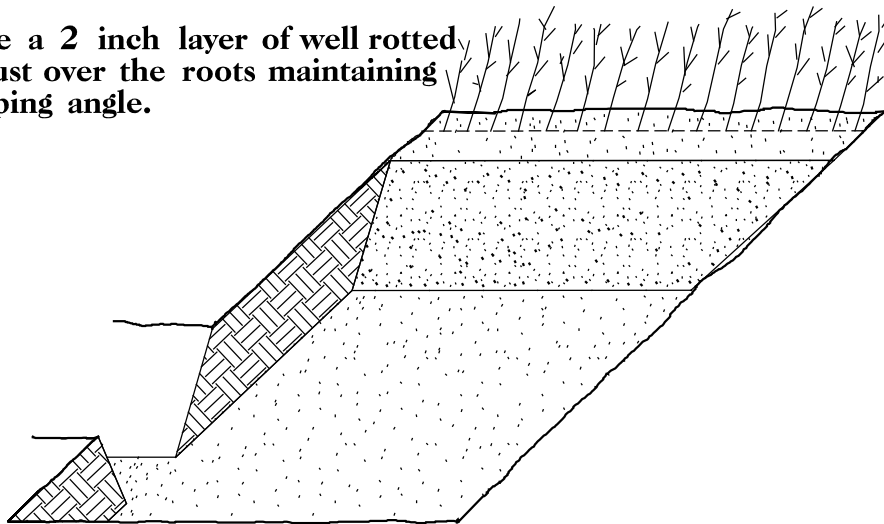
3. Backfill the trench with 2 inches well rotted sawdust. Place a 2 inch layer of well rotted sawdust at a sloping angle at one end of the trench.



4. Place a single layer of plants against the sloping end so that the root collar is at ground level.

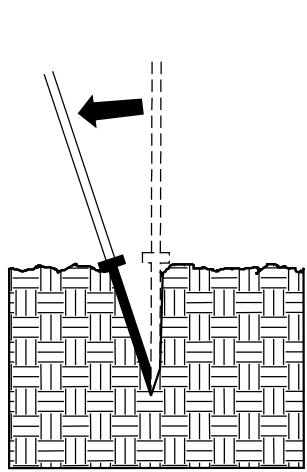


5. Place a 2 inch layer of well rotted sawdust over the roots maintaining a sloping angle.

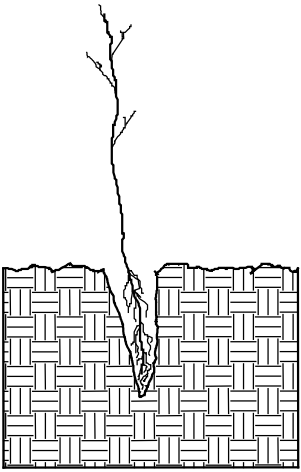


6. Repeat layers of plants and sawdust as necessary and water thoroughly.

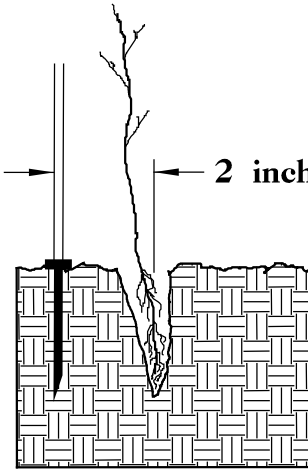
DIBBLE PLANTING METHOD
USING THE KBC PLANTING BAR



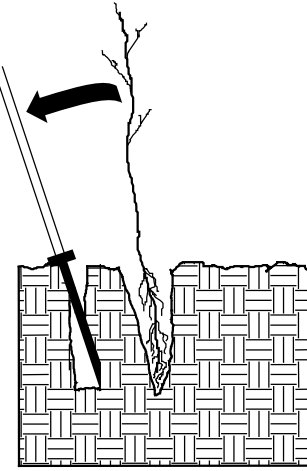
1. Insert planting bar as shown and pull handle toward planter.



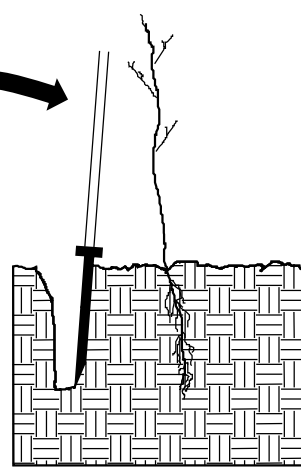
2. Remove planting bar and place seedling at correct depth.



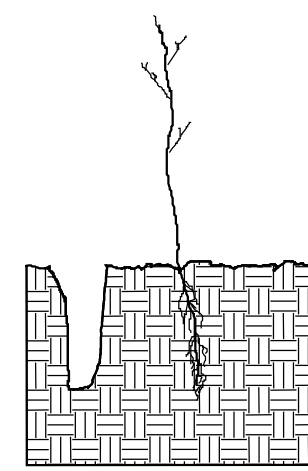
3. Insert planting bar 2 inches toward planter from seedling.



4. Pull handle of bar toward planter, firming soil at bottom.



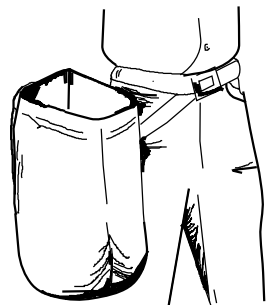
5. Push handle forward firming soil at top.



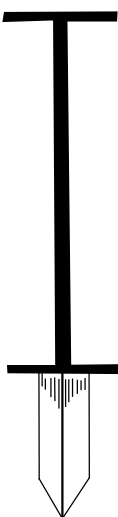
6. Leave compaction hole open. Water thoroughly.

PLANTING NOTES:

PLANTING BAG
During planting, seedlings shall be kept in a moist canvas bag or similar container to prevent the root systems from drying.



KBC PLANTING BAR
Planting bar shall have a blade with a triangular cross section, and shall be 12 inches long, 4 inches wide and 1 inch thick at center.



ROOT PRUNING
All seedlings shall be root pruned, if necessary, so that no roots extend more than 10 inches below the root collar.

REFORESTATION

- ☐ TREE REFORESTATION SHALL BE PLANTED 6 FT. TO 10 FT. ON CENTER, RANDOM SPACING, AVERAGING 8 FT. ON CENTER, APPROXIMATELY 680 PLANTS PER ACRE.

REFORESTATION

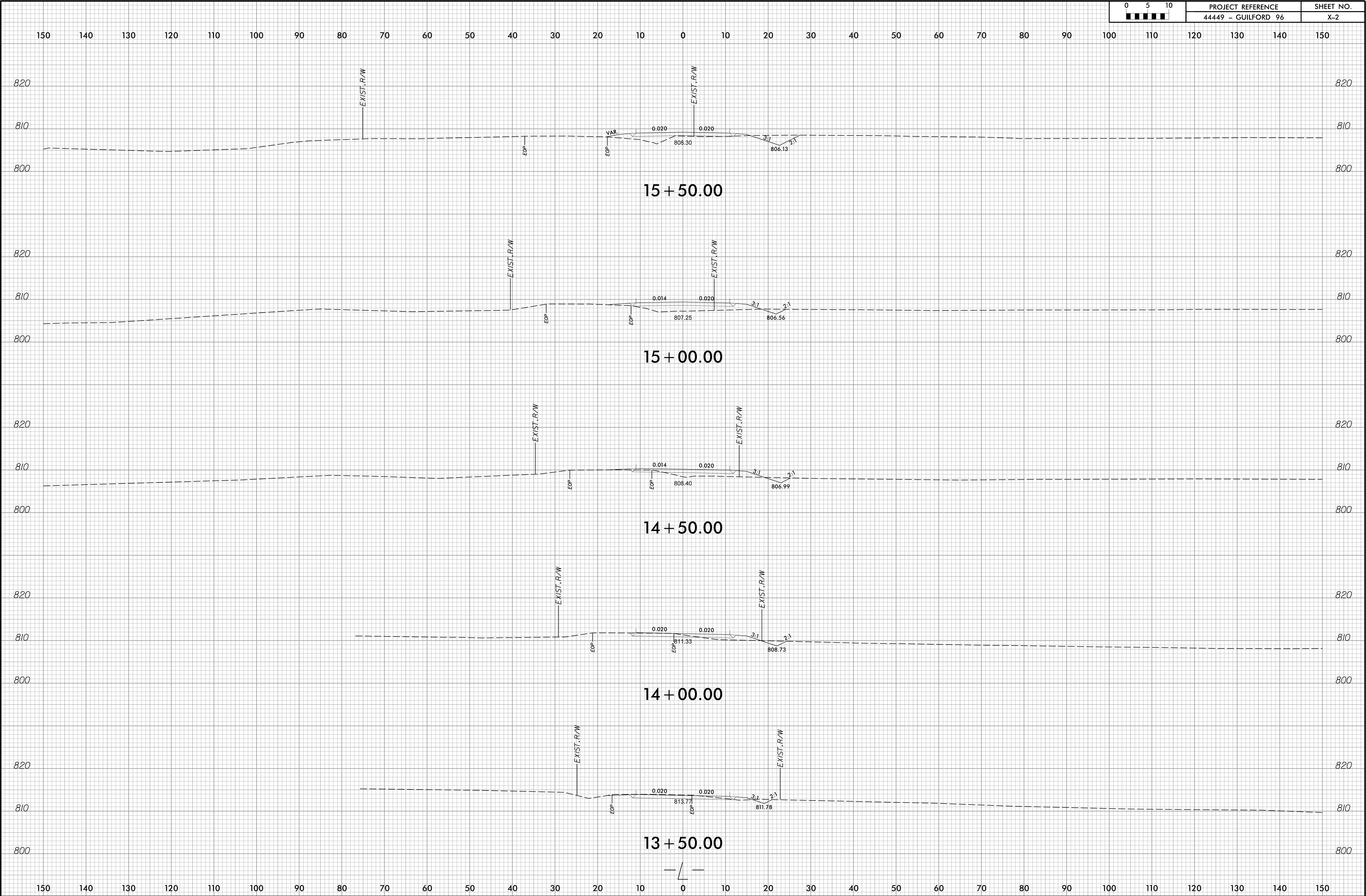
MIXTURE, TYPE, SIZE, AND FURNISH SHALL CONFORM TO THE FOLLOWING:

25% LIRIODENDRON TULIPIFERA	TULIP POPLAR	12 in - 18 in BR
25% PLATANUS OCCIDENTALIS	AMERICAN SYCAMORE	12 in - 18 in BR
25% FRAXINUS PENNSYLVANICA	GREEN ASH	12 in - 18 in BR
25% BETULA NIGRA	RIVER BIRCH	12 in - 18 in BR

REFORESTATION DETAIL SHEET

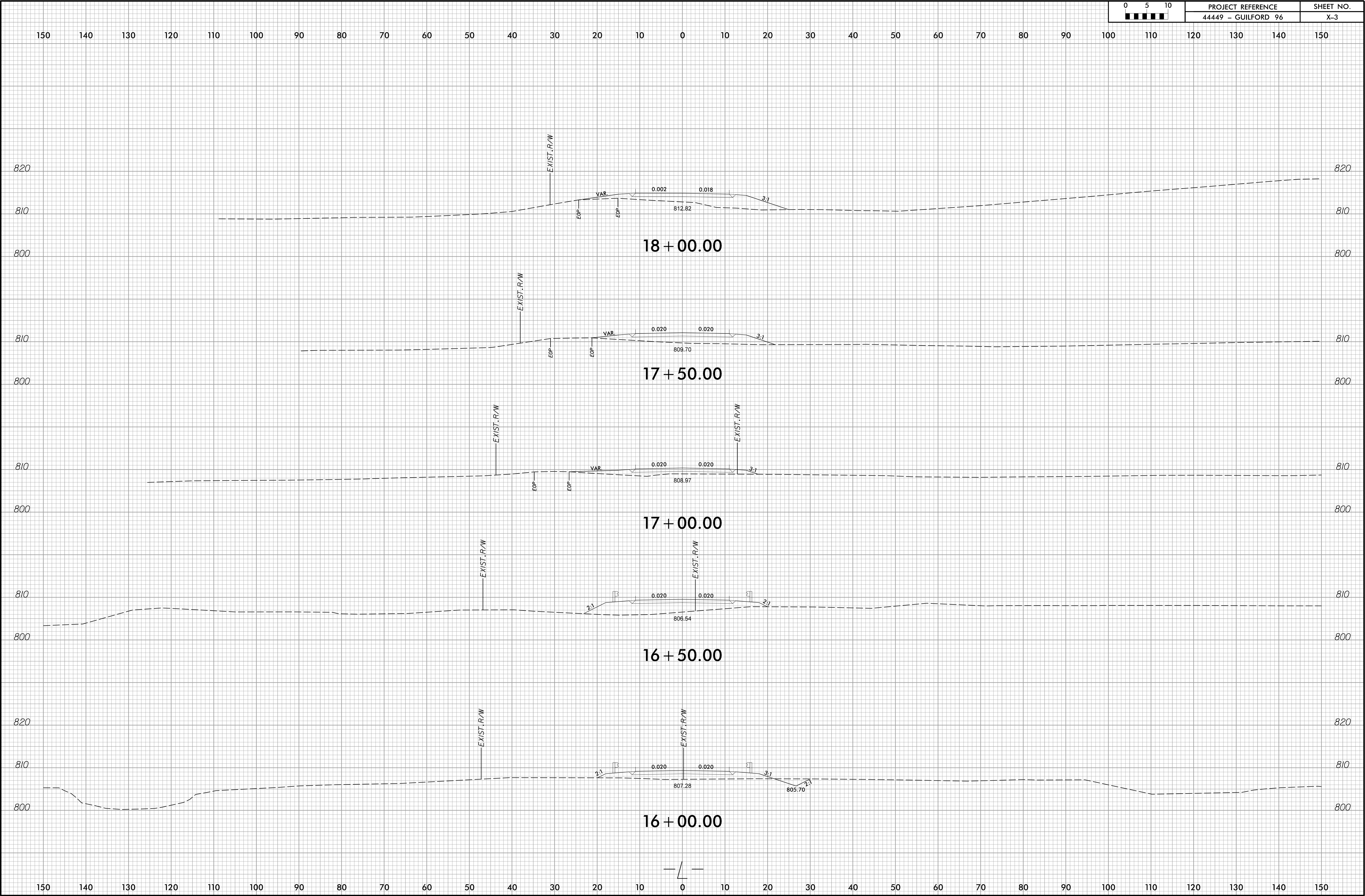
N.C.D.O.T. - ROADSIDE ENVIRONMENTAL UNIT

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0960103

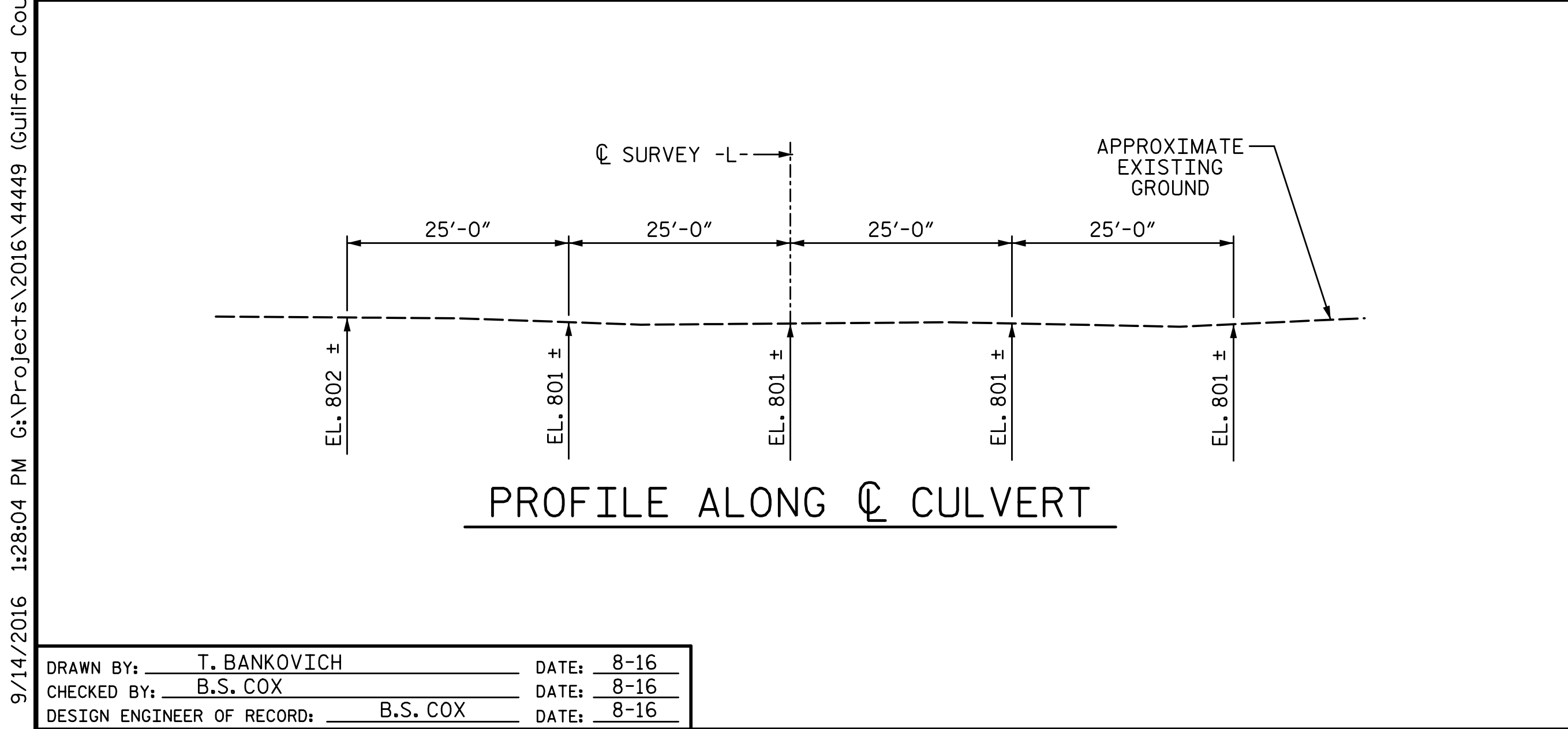
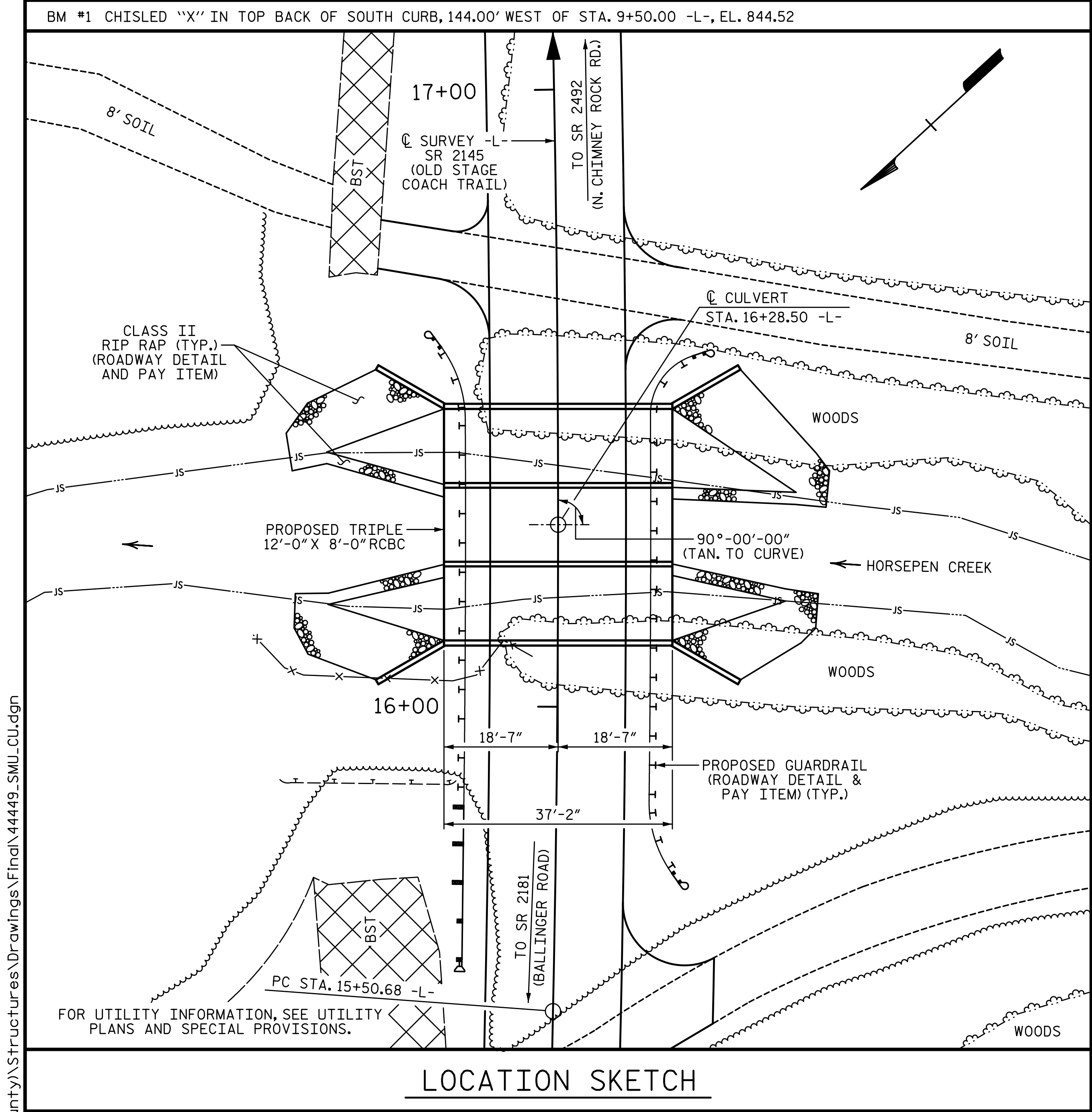


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0 5 10 ■■■■■	PROJECT REFERENCE	SHEET NO.
	44449 - GUILFORD 96	X-3







HYDRAULIC DATA:	
DESIGN DISCHARGE	= 2005 CFS
FREQUENCY OF DESIGN FLOOD	= 25 YEAR
DESIGN HIGH WATER ELEVATION	= 809.40
DRAINAGE AREA	= 2.5 SQ. MI.
BASE DISCHARGE (Q 100)	= 2690 CFS
BASE HIGH WATER ELEVATION	= 810.34

OVERTOPPING FLOOD DATA:	
OVERTOPPING DISCHARGE	= 2005 CFS
FREQUENCY OF OVERTOPPING FLOOD	= 25 YEAR
OVERTOPPING FLOOD ELEVATION	= 809.20 **
** OVERTOPPING OCCURS AT ROADWAY SAG AT STA. 15+38.10 -L-	

HORIZONTAL CURVE DATA	
PI STA. 16+38.96 -L-	
Δ = 2°-42'-42.7" (LT.)	
D = 1°-32'-09.9"	
L = 176.55'	
T = 88.29'	
R = 3730.00'	

GRADE DATA:	
GRADE POINT EL. @ STA. 16+28.50 -L- = EL. 809.46	
BED EL. @ STA. 16+28.50 -L- = 799.10	
ROADWAY SLOPE 2:1	

TOTAL STRUCTURE QUANTITIES		
CLASS A CONCRETE		
BARREL @	4.215 CY/FT	156.7 C.Y.
HEADWALLS		3.6 C.Y.
SILLS		3.6 C.Y.
WING ETC.		25.8 C.Y.
TOTAL		189.7 C.Y.
REINFORCING STEEL		
BARREL		22,687 LBS.
WINGS ETC.		1,453 LBS.
TOTAL		24,140 LBS.
CULVERT EXCAVATION		LUMP SUM
FOUNDATION CONDITIONING MATERIAL		114 TONS

NOTES:

ASSUMED LIVE LOAD -----HL-93 OR ALTERNATE LOADING.

DESIGN FILL----- 1'-3" (MIN.) AND 2'-6" (MAX.)

FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.

3" Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.

CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:

1. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS.
2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALLS.

THE ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.

DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.

STEEL IN THE BOTTOM SLAB MAY BE SPLICED AT THE PERMITTED CONSTRUCTION JOINT AT THE CONTRACTOR'S OPTION. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.

AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL AND BOTH FACES OF INTERIOR WALLS ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.

FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

A 3 FOOT STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.

THE EXISTING STRUCTURE WAS REMOVED IN 2008.

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. 44449
GUILFORD COUNTY
STATION: 16+28.50 -L-

SHEET 1 OF 6 REPLACES BRIDGE #96

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 12 FT. X 8 FT.
CONCRETE BOX CULVERT

90° SKEW

REVISIONS						SHEET NO. C-1
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 6
2			4			

PLANS PREPARED BY:

SLIMPSON ENGINEERS & ASSOCIATES

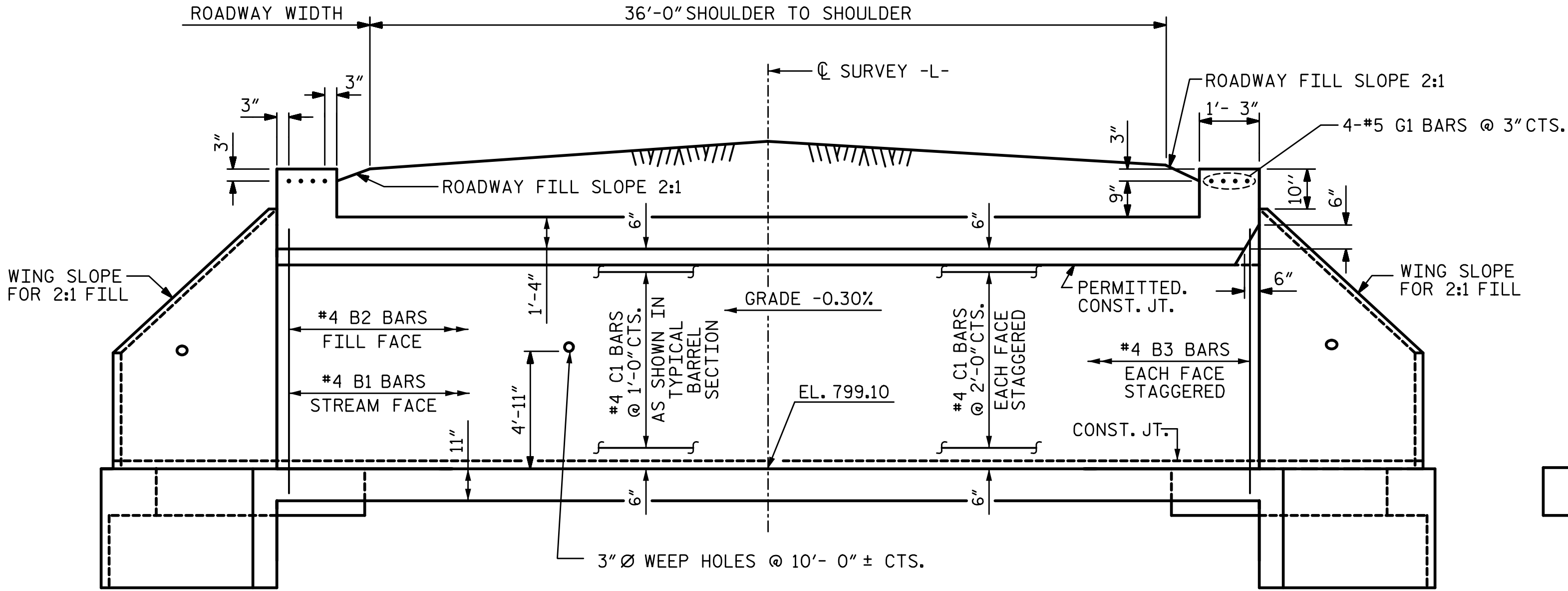
5640 Dillard Drive
Suite 200
Cary, NC 27518
(919) 852-0468
(919) 852-0598 (Fax)
www.slimpsonengr.com

LICENSURE NO. C-2521

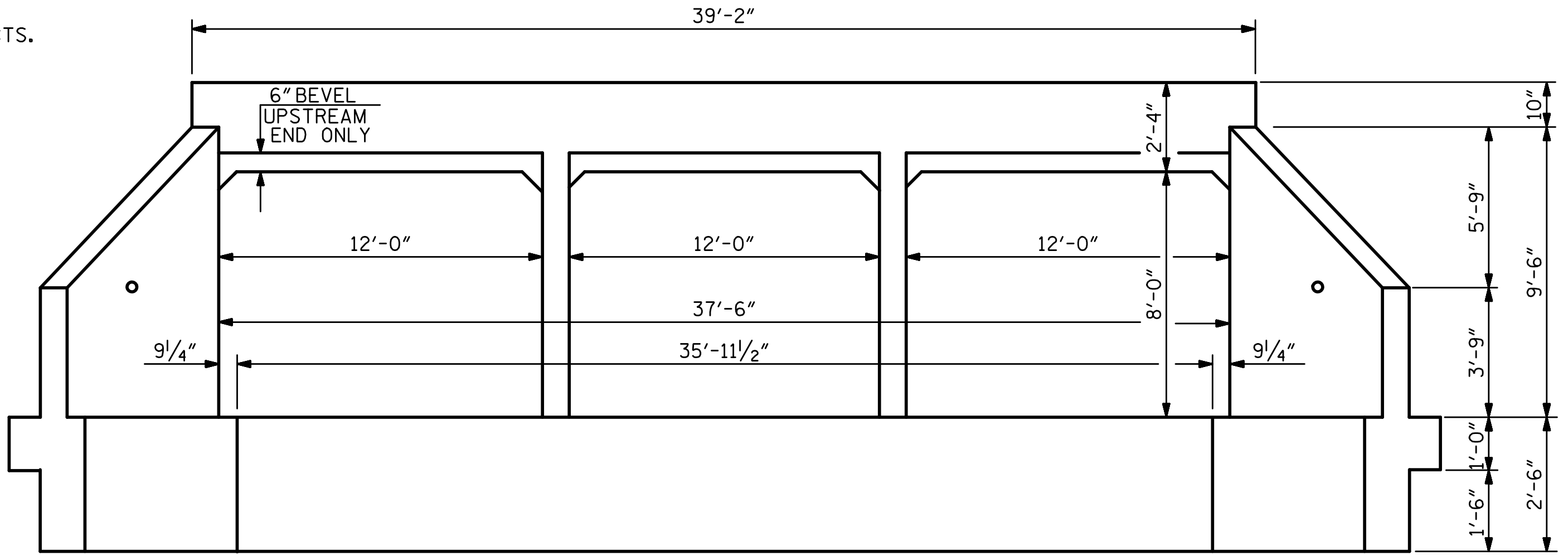
NORTH CAROLINA PROFESSIONAL ENGINEER
BETSY S. COX
9/14/2016

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UNLESS ALL SIGNATURES COMPLETED

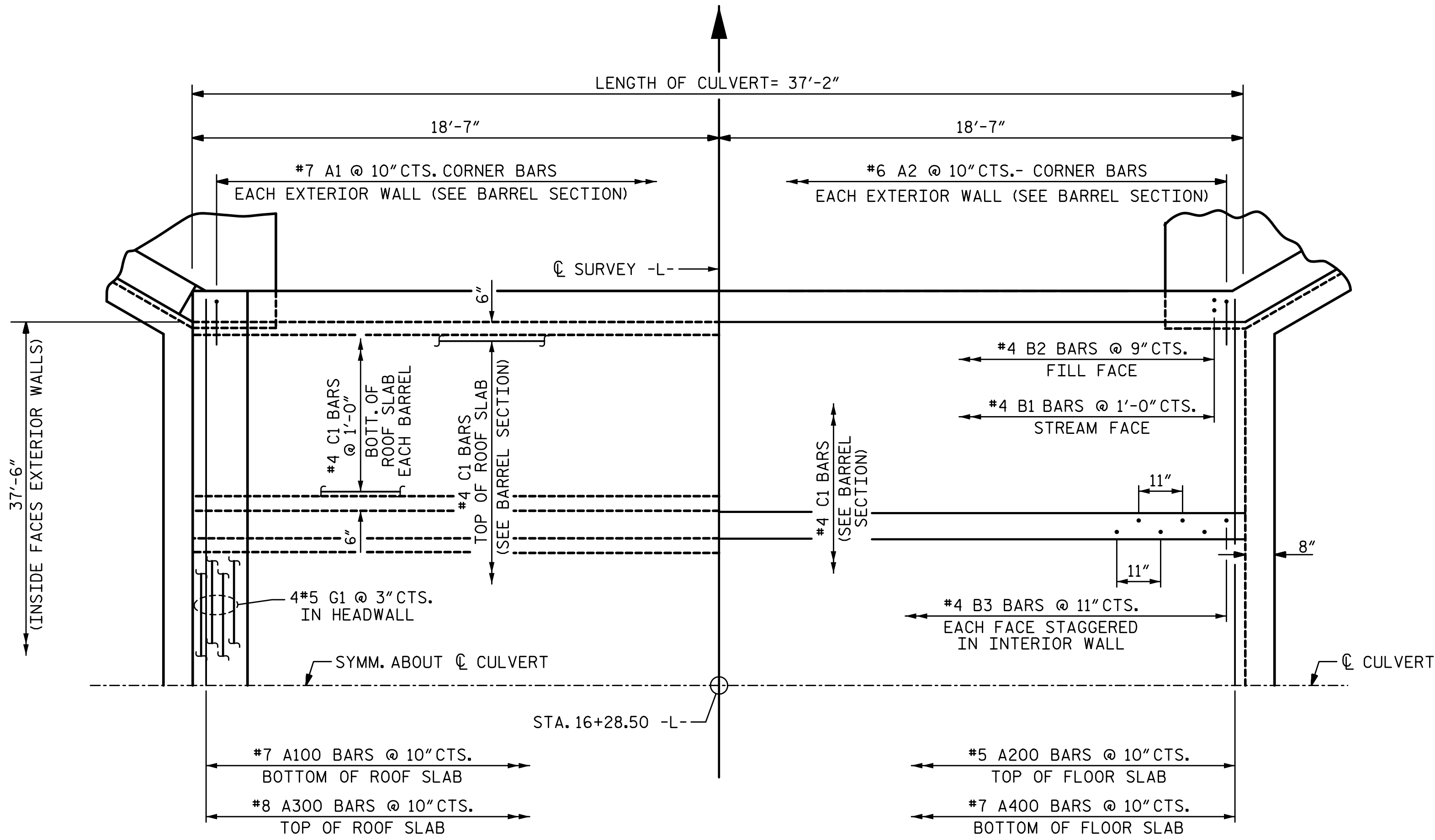
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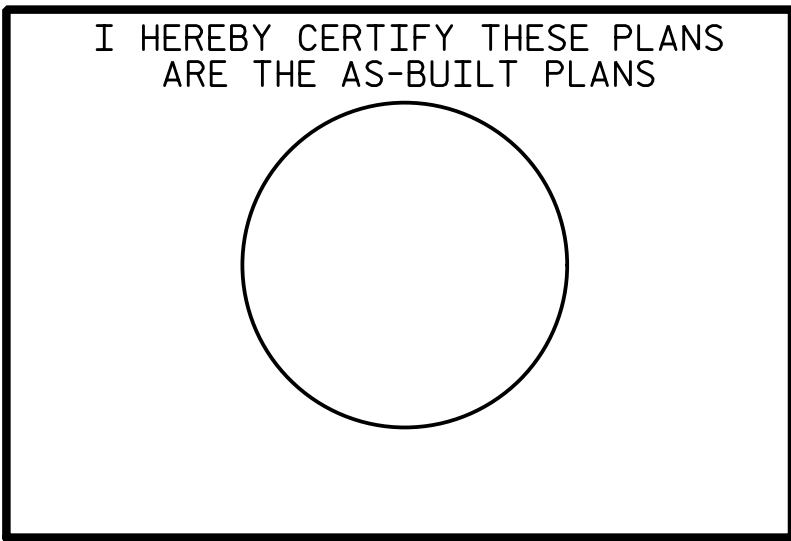
EXTERIOR WALL INTERIOR WALL
CULVERT SECTION NORMAL TO ROADWAY
(CONCRETE SILLS NOT SHOWN)



END ELEVATION - LOOKING DOWNSTREAM
(UPSTREAM END SHOWN, DOWNSTREAM END SIMILAR)
(CONCRETE SILLS NOT SHOWN FOR CLARITY)



PART PLAN - ROOF SLAB PART PLAN - FLOOR SLAB
(C1 BARS ARE 2 BAR RUNS) (CONCRETE SILLS NOT SHOWN FOR CLARITY)



PROJECT NO. 44449
GUILFORD COUNTY
STATION: 16+28.50 -L-

SHEET 2 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 12 FT. X 8 FT.
CONCRETE BOX CULVERT

90° SKEW

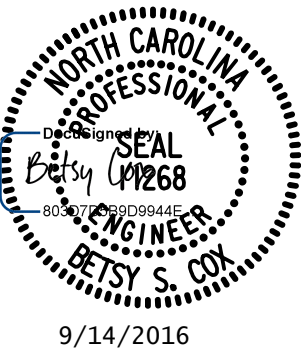
REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			C-2
2			4			TOTAL SHEETS 6

PLANS PREPARED BY:

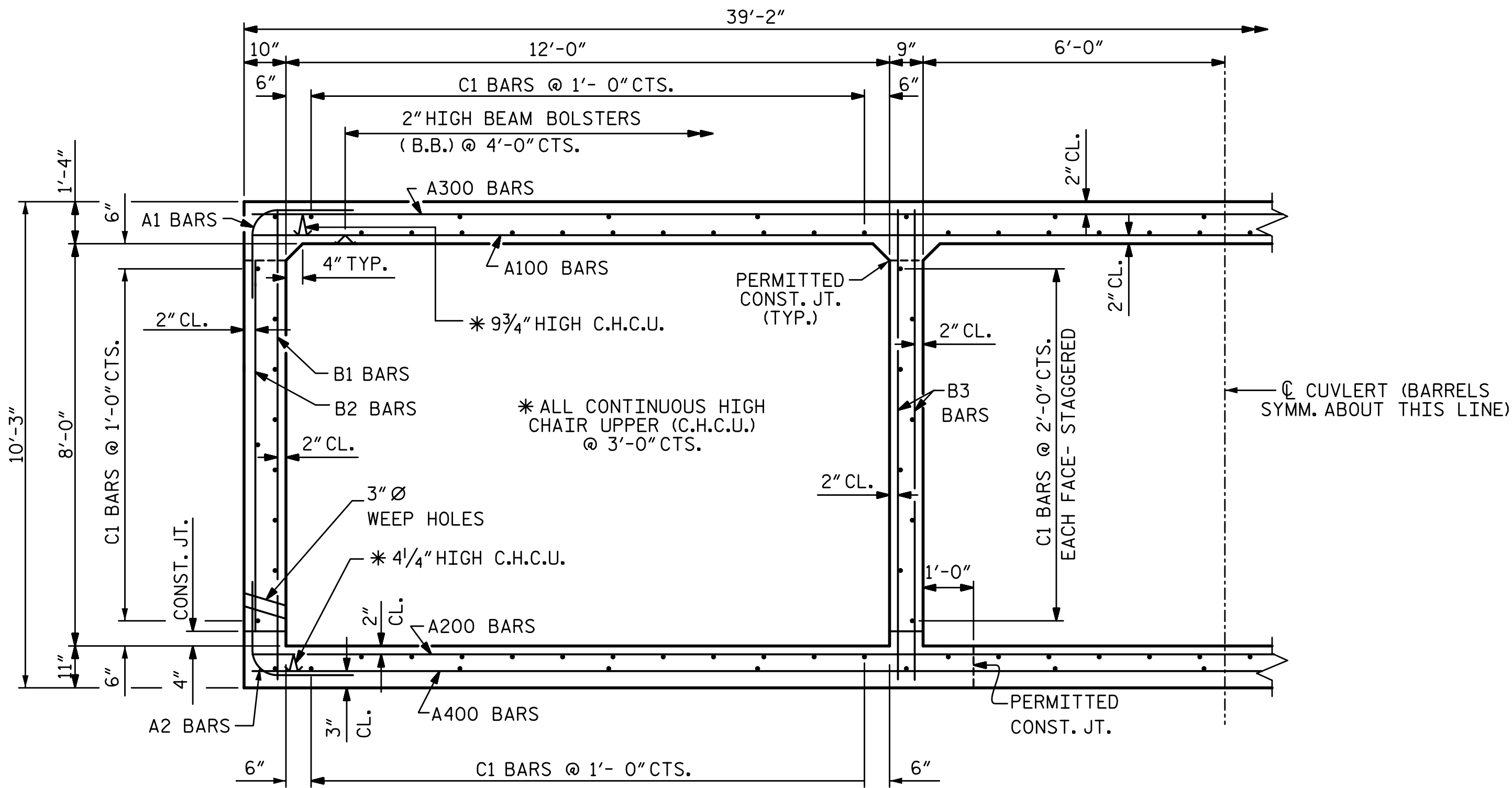
SIMPSON
& ASSOCIATES
5640 Dillard Drive
Suite 200
Cary, NC 27518
(919) 852-0468
(919) 852-0598 (Fax)
www.simpsonengr.com

LICENSURE NO. C-2521

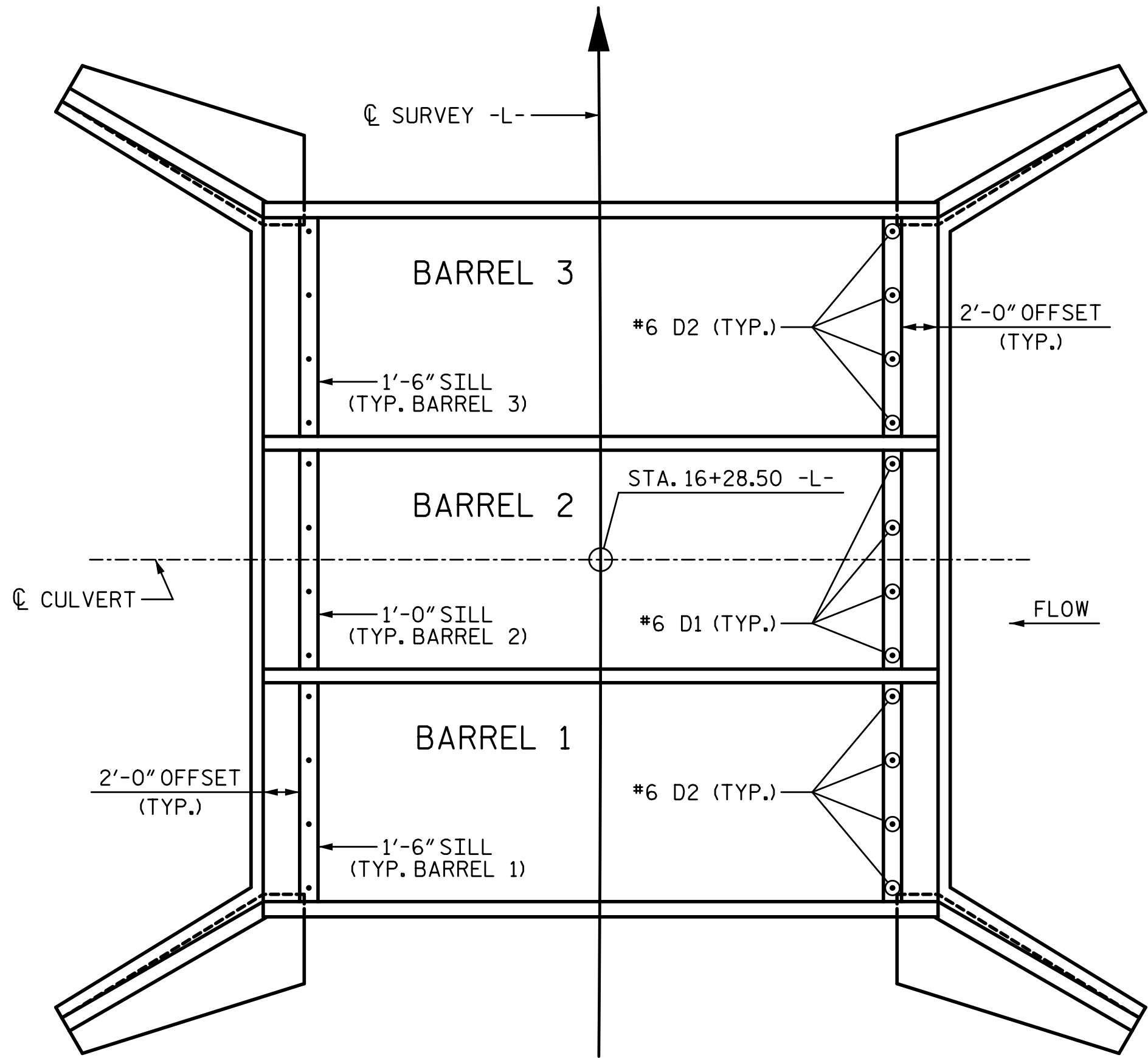


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UNLESS ALL SIGNATURES COMPLETED

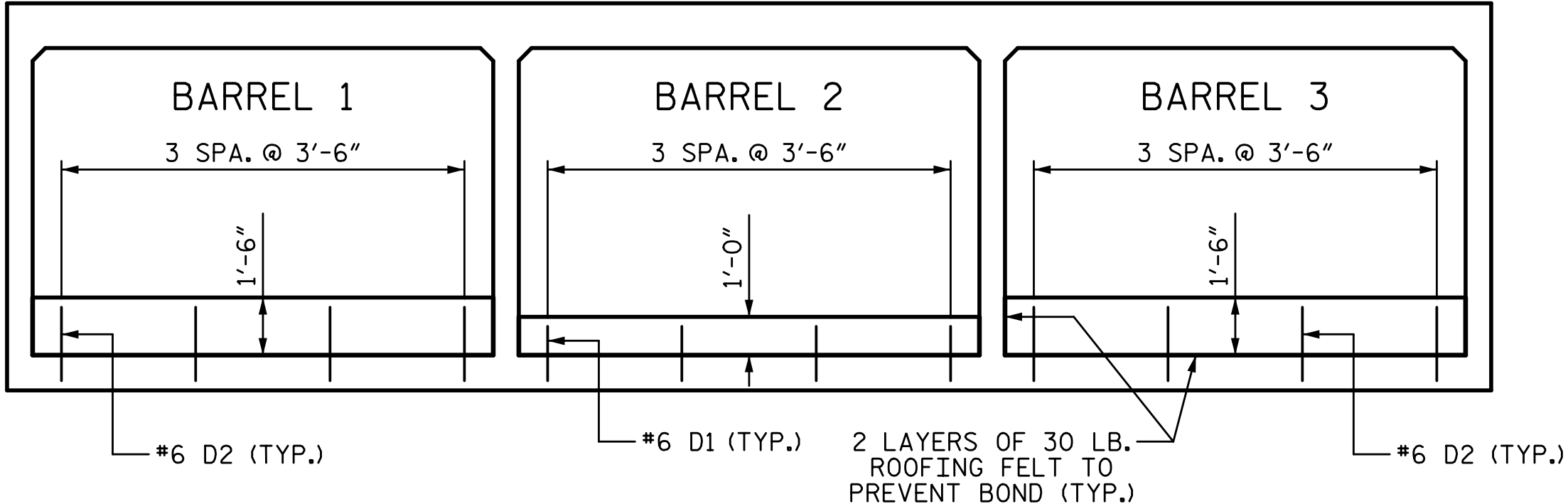
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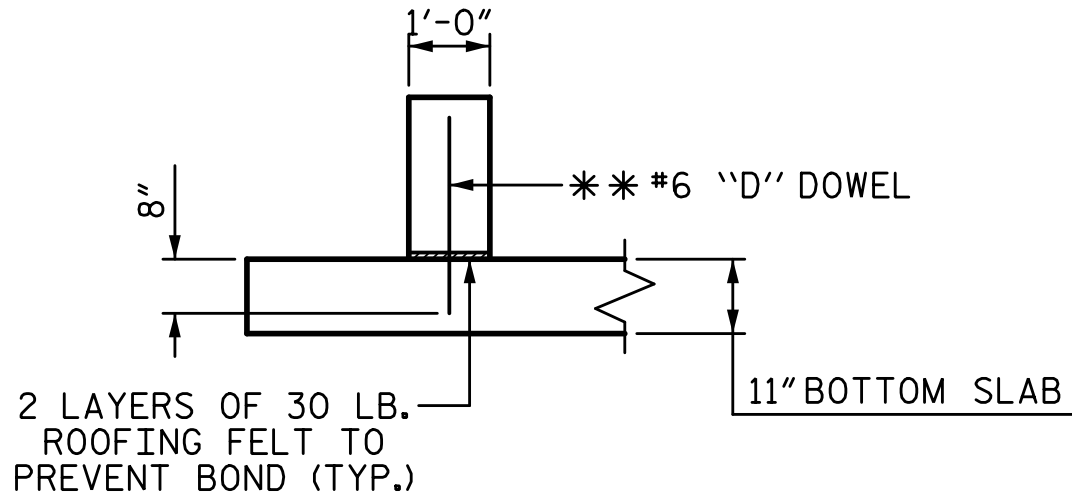
SECTION OF BARREL
(THERE ARE 132 "C" BARS IN SECTION OF BARREL)



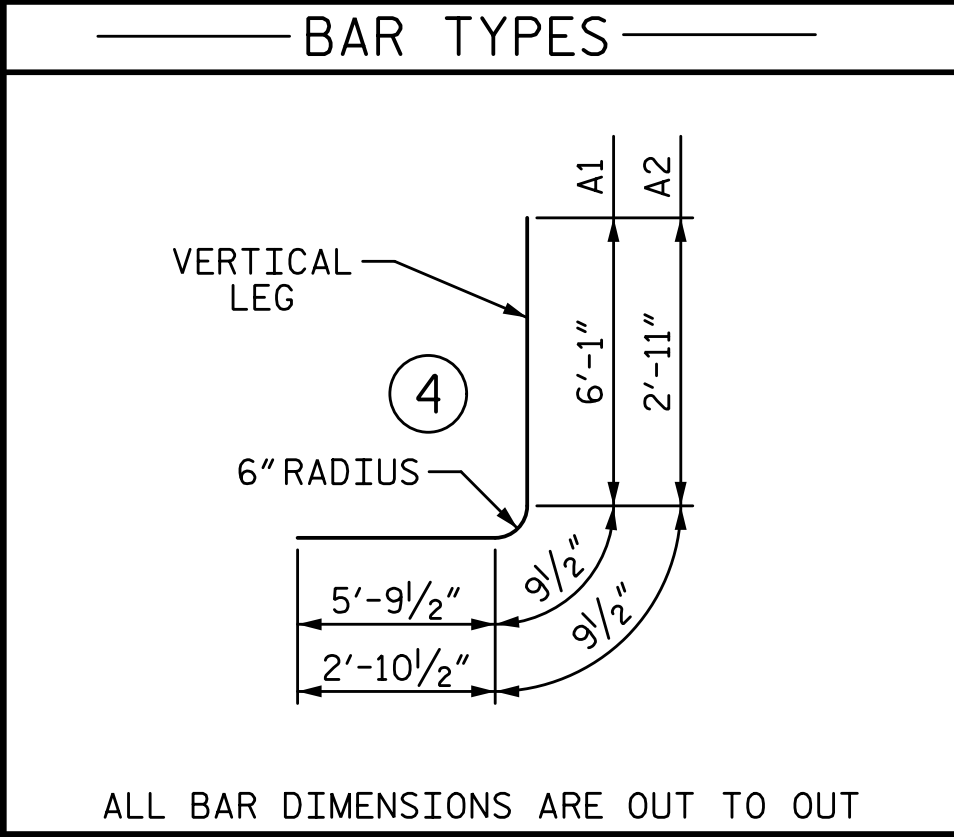
FLOOR PLAN
(SHOWING PLACEMENT OF SILLS)



ELEVATION - LOOKING DOWNSTREAM



SECTION THROUGH SILL
**DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED.



ALL BAR DIMENSIONS ARE OUT TO OUT

SPLICE CHART

- #4 B1 SPLICE LENGTH = 1'-9"
- #4 B3 SPLICE LENGTH = 1'-9"
- #4 C1 SPLICE LENGTH = 1'-11"
- #5 A200 SPLICE LENGTH = 2'-2"
- #7 A400 SPLICE LENGTH = 3'-9"

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	90	7	4	12'-8"	2330
A2	90	6	4	6'-7"	890
A100	45	7	STR	38'-9"	3564
A200	45	5	STR	38'-9"	1819
A300	45	8	STR	38'-9"	4656
A400	45	7	STR	38'-9"	3564
B1	76	4	STR	9'-10"	499
B2	100	4	STR	7'-4"	490
B3	164	4	STR	9'-10"	1077
C1	264	4	STR	19'-4"	3409
D1	8	6	STR	1'-6"	18
D2	16	6	STR	2'-0"	48
G1	8	5	STR	38'-9"	323
TOTAL REINFORCING STEEL					22687 LB
CLASS A CONCRETE BREAKDOWN					
BARREL					156.7 CY
HEADWALLS					3.6 CY
SILL					3.6 CY

PROJECT NO. 44449
GUILFORD COUNTY
STATION: 16+28.50 -L-

SHEET 3 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 12 FT. X 8 FT.
CONCRETE BOX CULVERT

90° SKEW

REVISIONS

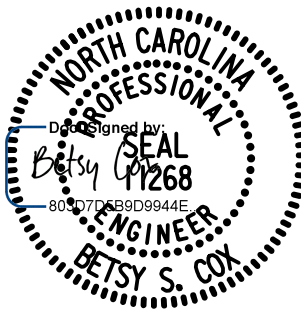
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			C-3
2			4			TOTAL SHEETS 6

PLANS PREPARED BY:

SIMPSON
ENGINEERS
& ASSOCIATES

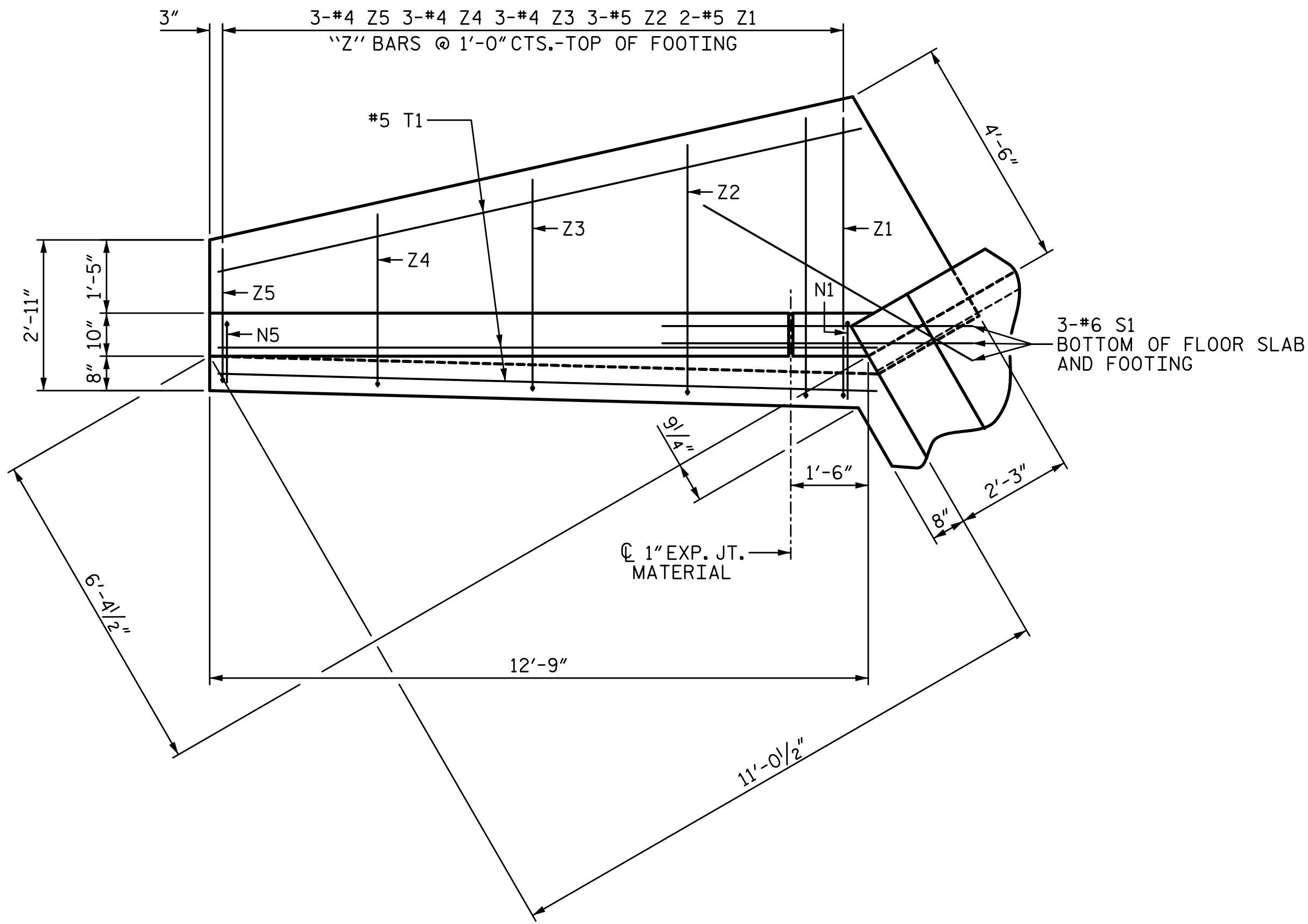
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www.simpsonengr.com

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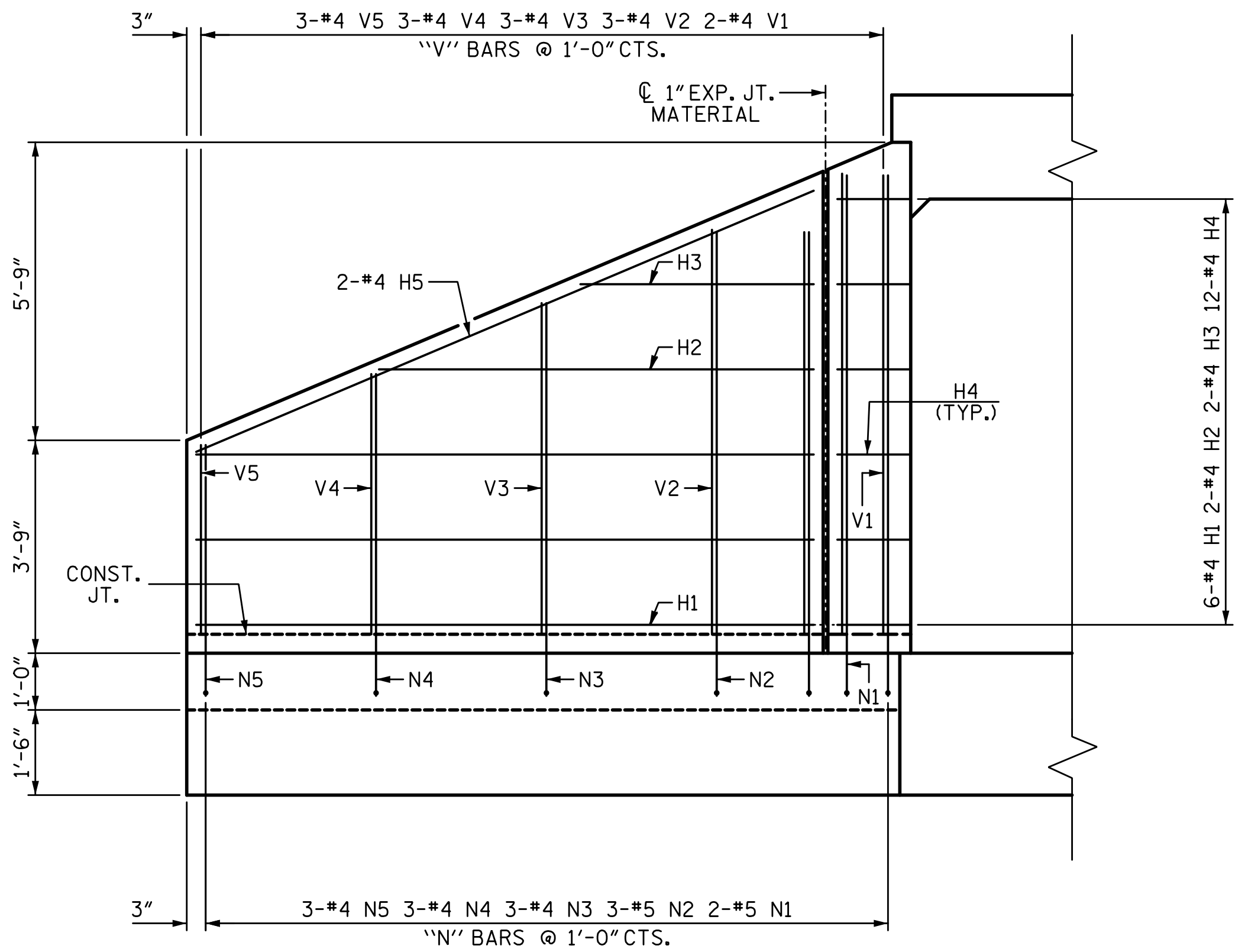


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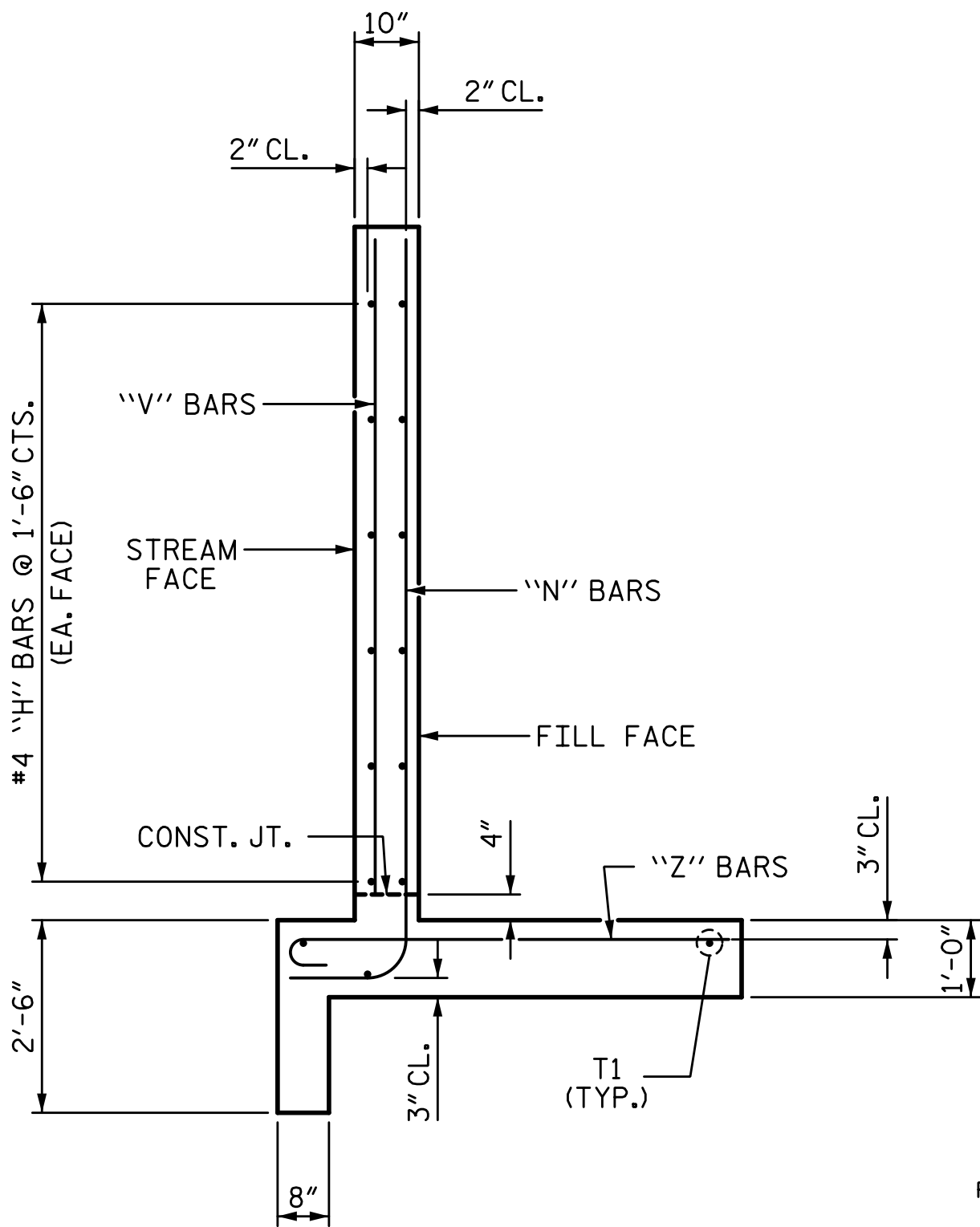
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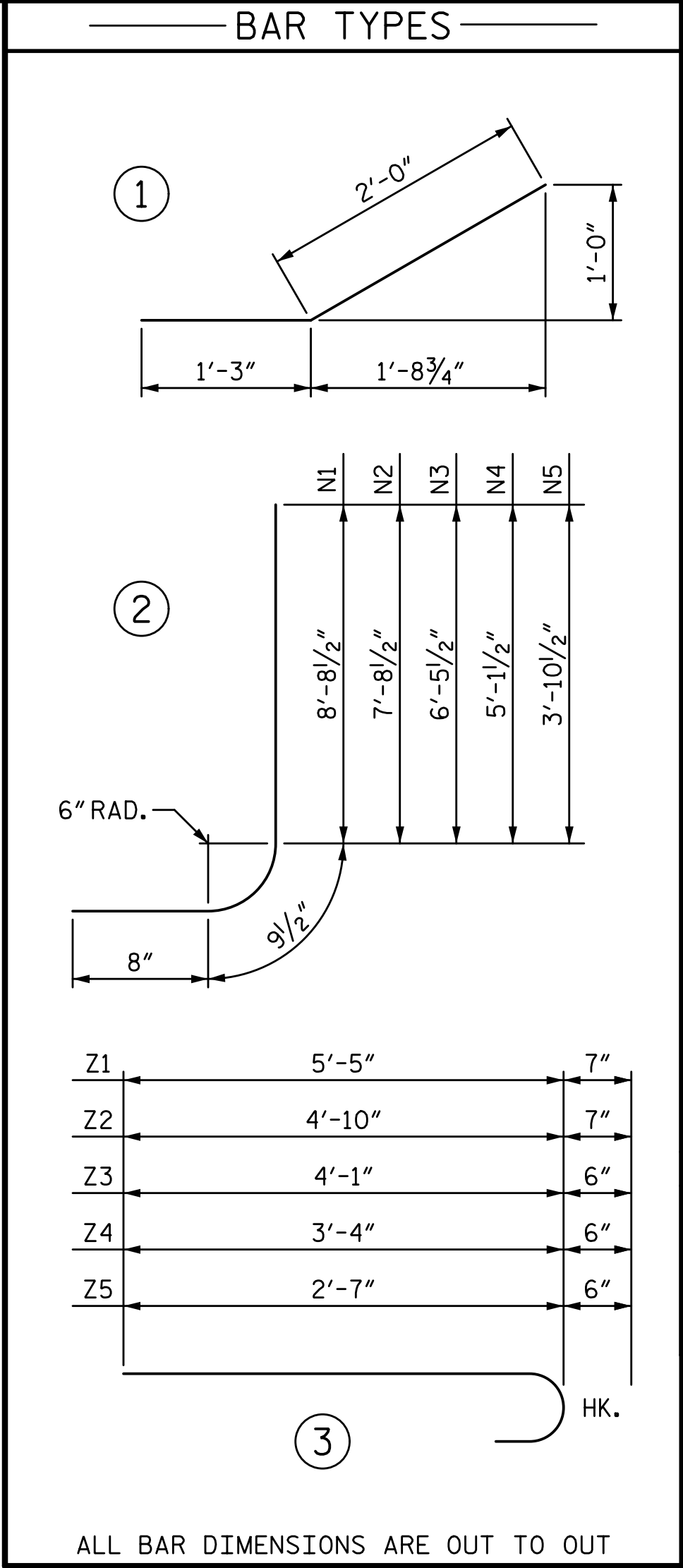
PLAN



ELEVATION



TYPICAL WING SECTION



BILL OF MATERIAL					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	24	4	STR	10'-10"	174
H2	8	4	STR	7'-8"	41
H3	8	4	STR	4'-1"	22
H4	48	4	1	3'-3"	104
H5	8	4	STR	11'-9"	63
N1	8	5	2	10'-2"	85
N2	12	5	2	9'-2"	115
N3	12	4	2	7'-11"	63
N4	12	4	2	6'-7"	53
N5	12	4	2	5'-4"	43
S1	12	6	STR	6'-0"	108
T1	12	5	STR	12'-9"	160
V1	8	4	STR	8'-1"	43
V2	12	4	STR	7'-1"	57
V3	12	4	STR	5'-10"	47
V4	12	4	STR	4'-7"	37
V5	12	4	STR	3'-4"	27
Z1	8	5	3	6'-0"	50
Z2	12	5	3	5'-5"	68
Z3	12	4	3	4'-7"	37
Z4	12	4	3	3'-10"	31
Z5	12	4	3	3'-1"	25
TOTAL REINFORCING STEEL FOR 4 WINGS					1453 LB
CLASS A CONCRETE BREAKDOWN					
4 WINGS					21.4 CY
2 END CURTAIN WALLS					4.4 CY
TOTAL					25.8 CY

PROJECT NO. 44449
GUILFORD COUNTY
STATION: 16+28.50 -L-

SHEET 4 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

WINGS FOR
CONCRETE BOX CULVERT
H = 8'-0" SLOPE 2:1
90° SKEW

REVISIONS						SHEET NO. C-4
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 6
2			4			

PLANS PREPARED BY:

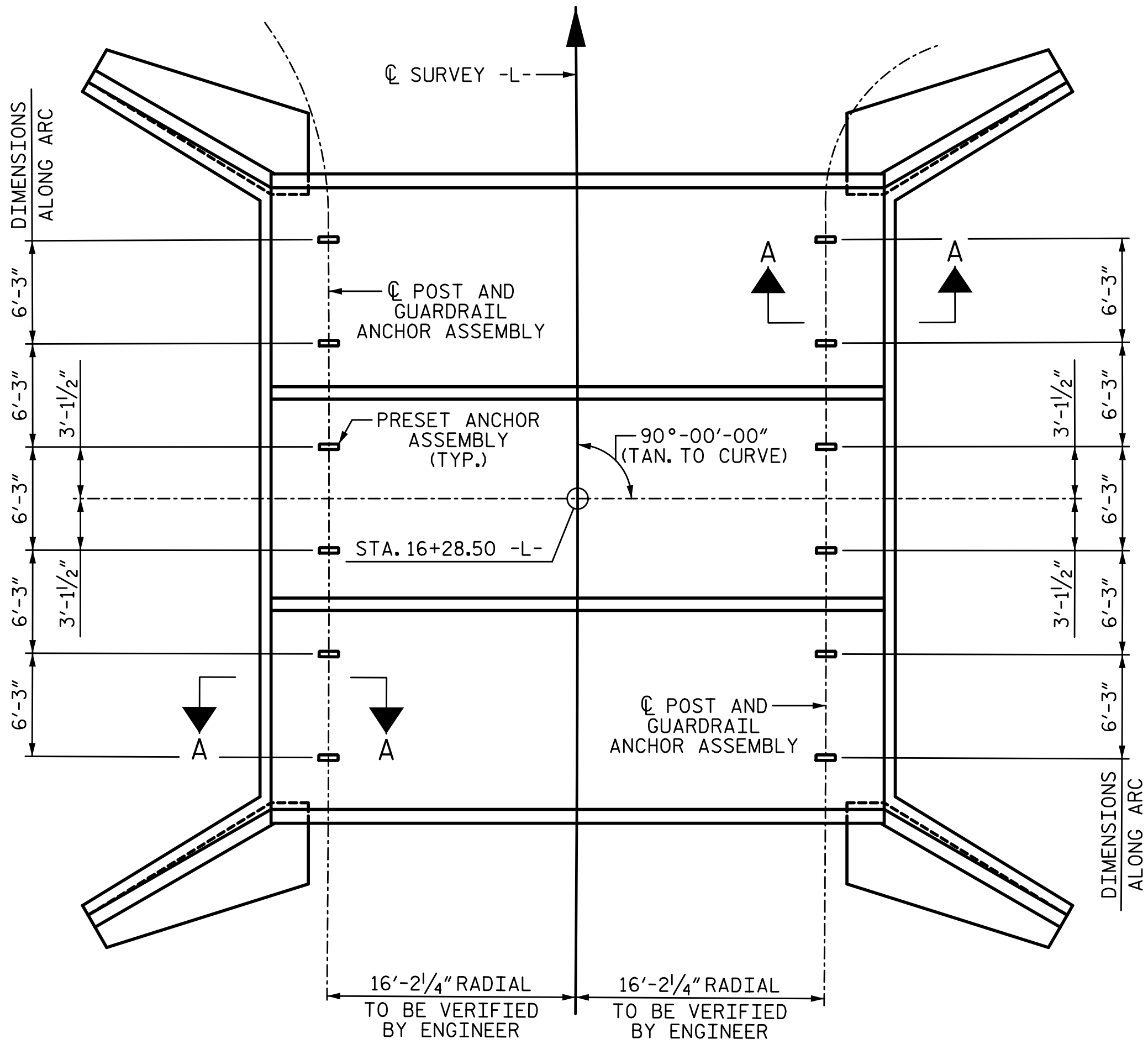
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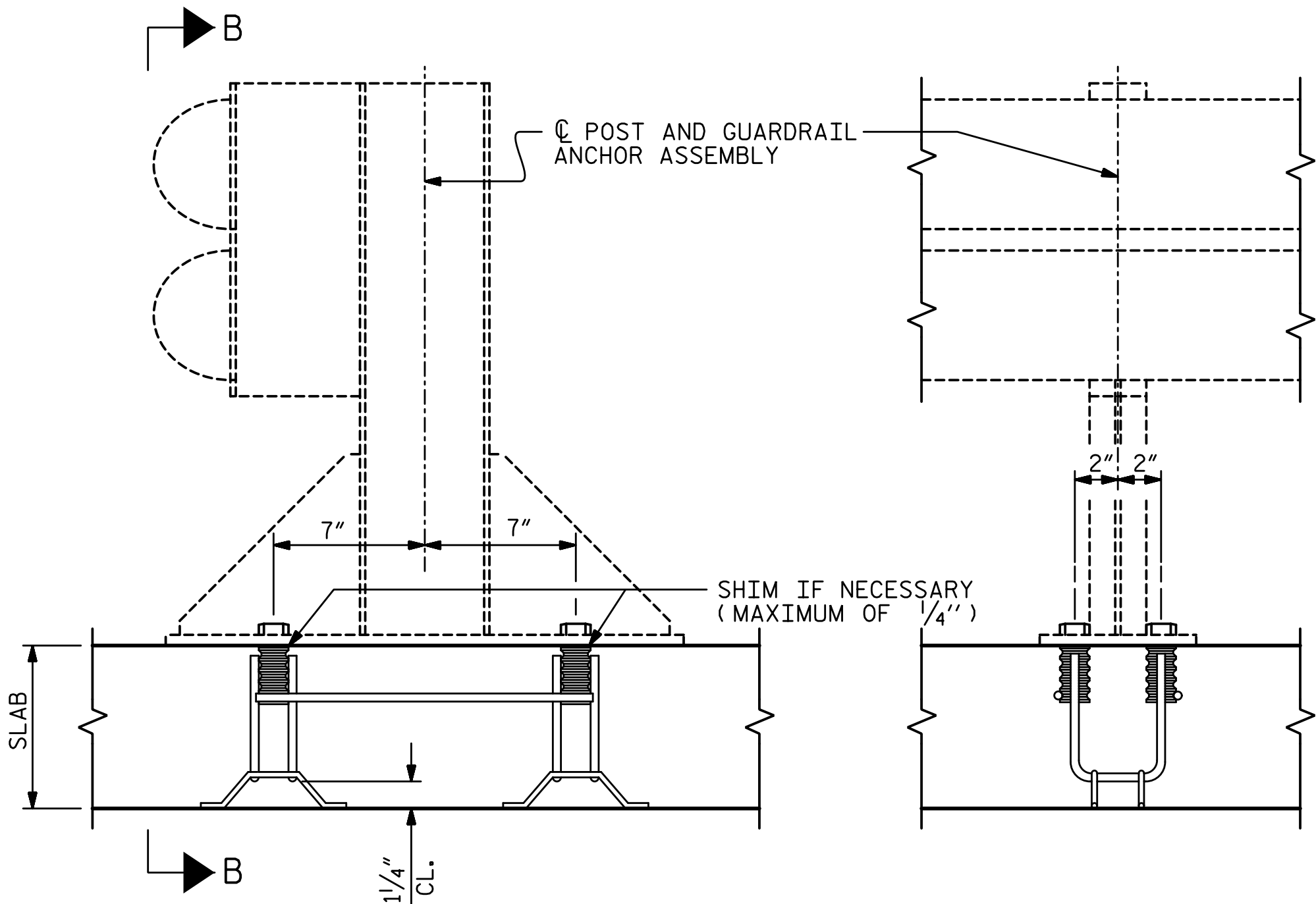


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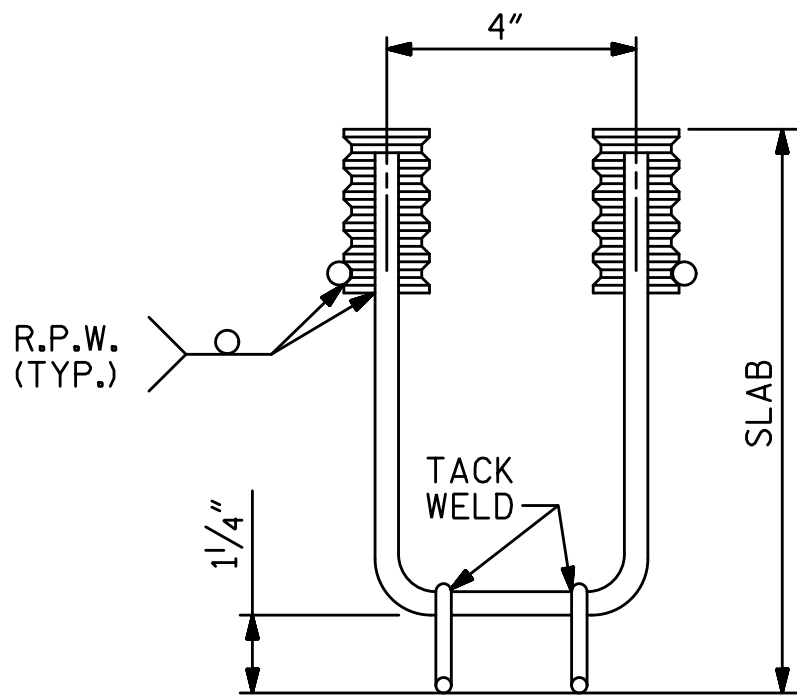


PLAN
(SHOWING GUARDRAIL ANCHOR ASSEMBLY SPACING)

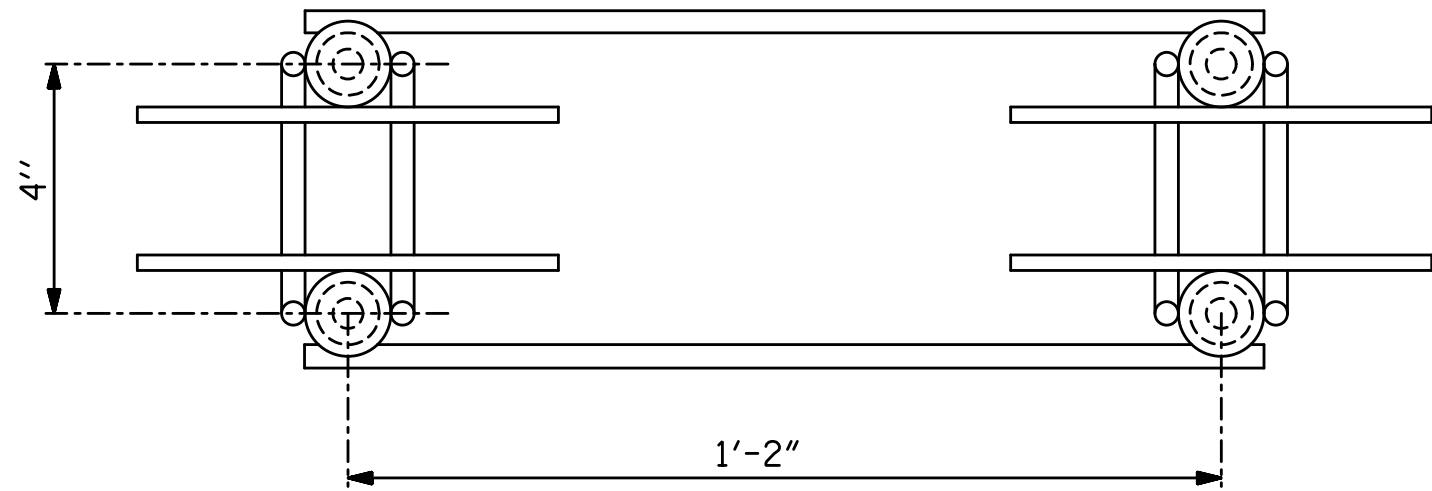


SECTION A-A

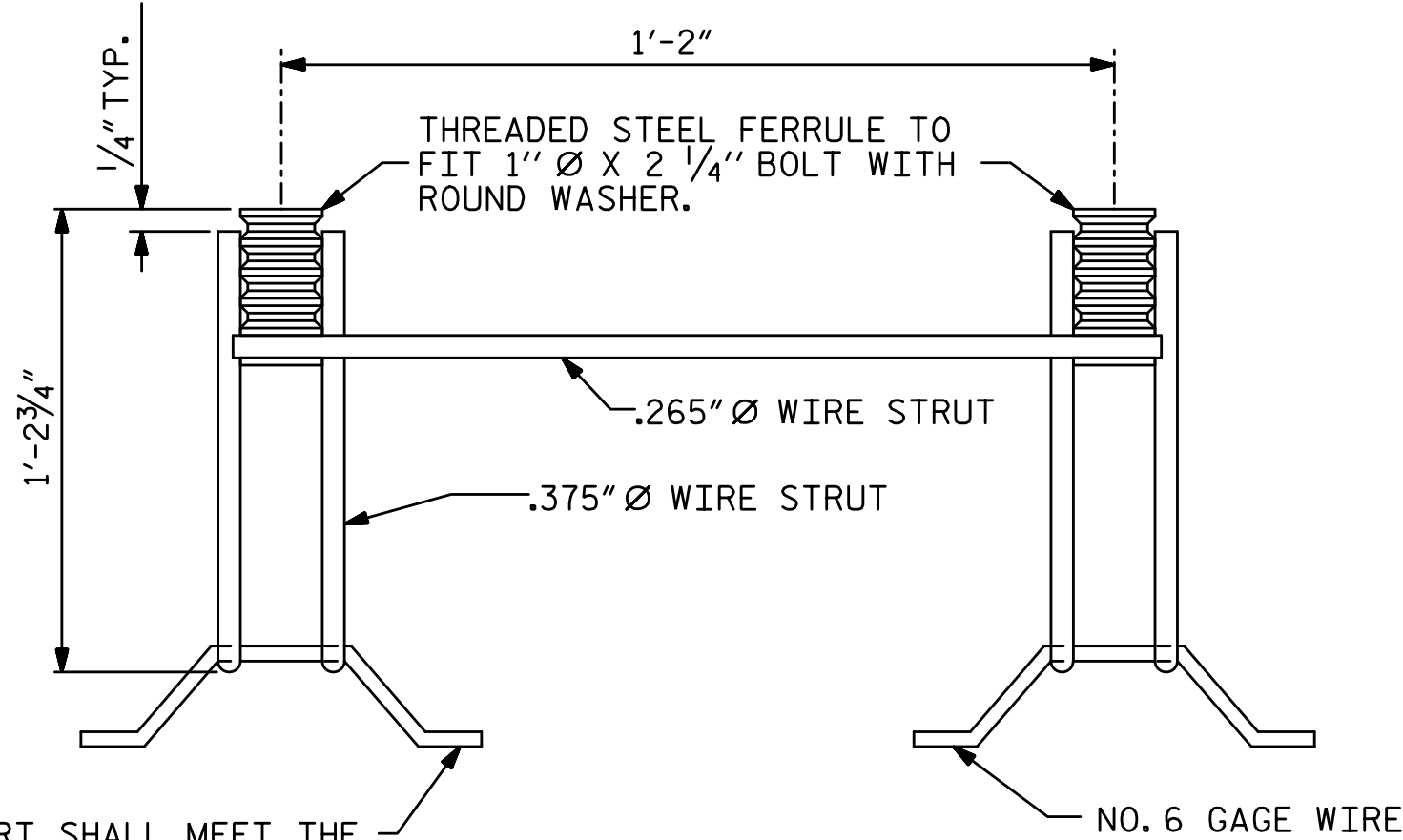
SECTION B-B



ELEVATION



PLAN



SIDE VIEW

THIS SUPPORT SHALL MEET THE REQUIREMENTS AS SPECIFIED FOR SUPPORTS FOR REINFORCING STEEL. SEE SPECIFICATIONS.

GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

NOTES:

THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS SHALL CONSIST OF THE FOLLOWING COMPONENTS :

- FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2 1/2".
- 4 - 1" Ø X 2 1/4" BOLTS WITH WASHERS, BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 1" Ø X 2 1/4" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)
- WIRE STRUTS SHOWN IN THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS DETAIL ARE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 P.S.I. AS AN OPTION, A 1/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

GUARDRAIL ANCHOR ASSEMBLY WITH BOLTS SHALL BE ASSEMBLED IN THE SHOP. BOLT THREADS MAY BE RECUT AS NECESSARY TO INSURE FIT.

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CLASS "A" CONCRETE.

FERRULES TO BE PLUGGED DURING POURING OF SLAB AS RECOMMENDED BY THE MANUFACTURER.

AT THE CONTRACTOR'S OPTION, FERRULES WITH OPEN OR CLOSED ENDS MAY BE USED.

PAYMENT FOR GUARDRAIL, POSTS, AND POST BASE PLATES IS INCLUDED IN ROADWAY PAY ITEMS.

SLAB REINFORCING STEEL MAY BE SHIFTED AS NECESSARY TO CLEAR GUARDRAIL ANCHOR ASSEMBLY. CARE SHOULD BE TAKEN TO KEEP THE SHIFTING OF REINFORCING STEEL TO A MINIMUM.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF GUARDRAIL ANCHOR ASSEMBLY. LEVEL TWO FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 1" Ø BOLT IS 21.8 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS.

PROJECT NO. 44449
GUILFORD COUNTY
STATION: 16+28.50 -L-

SHEET 5 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

ANCHORAGE DETAILS
FOR GUARDRAIL
ANCHOR ASSEMBLY
FOR CULVERTS

REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.

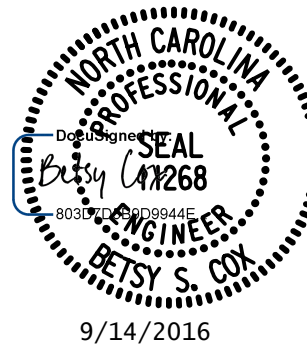
C-5

TOTAL

SHEETS

6

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LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS																
LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING ⬡	MINIMUM RATING FACTORS (RF)	TONS = W × RF	STRENGTH I LIMIT STATE										COMMENT NUMBER
						LIVE-LOAD, FACTORS (γ _{LL})	MOMENT				SHEAR					
							RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)		
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	⬡1	1.05	- -	1.75	1.52	1	TOP SLAB - MID	5.12	1.05	1	TOP SLAB - RT END	10.61		
	HL-93 (OPERATING)	N/A		1.36	- -	1.35	1.97	1	TOP SLAB - MID	5.12	1.36	1	TOP SLAB - RT END	10.61		
	HS-20 (INVENTORY)	36.000	⬡2	1.09	39.2	1.75	1.51	1	BOT SLAB - MID	5.12	1.09	1	TOP SLAB - RT END	10.61		
	HS-20 (OPERATING)	36.000		1.41	50.9	1.35	1.96	1	BOT SLAB - MID	5.12	1.41	1	TOP SLAB - RT END	10.61		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH		2.97	40.1	1.40	2.97	1	TOP SLAB - MID	5.12	3.10	1	TOP SLAB - RT END	10.61		
		SNGARBS2		2.70	54.0	1.40	2.77	1	TOP SLAB - MID	5.12	2.70	1	TOP SLAB - RT END	10.61		
		SNAGRIS2		2.62	57.6	1.40	2.96	1	TOP SLAB - MID	5.12	2.62	2	INNER BOT SLAB - LT END	1.04		
		SNCOTTS3	⬡3	1.28	34.9	1.40	1.88	1	TOP SLAB - MID	5.12	1.28	1	TOP SLAB - RT END	10.61		
		SNAGGRS4		1.49	52.0	1.40	1.88	1	BOT SLAB - MID	5.12	1.49	1	TOP SLAB - RT END	10.61		
		SNS5A		1.41	50.1	1.40	1.84	1	BOT SLAB - MID	5.12	1.41	1	TOP SLAB - RT END	10.61		
		SNS6A		1.39	55.5	1.40	1.66	1	BOT SLAB - MID	5.12	1.39	1	TOP SLAB - RT END	10.61		
		SNS7B		1.38	58.0	1.40	1.63	1	BOT SLAB - MID	5.12	1.38	1	TOP SLAB - RT END	10.61		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3		1.76	58.1	1.40	2.10	1	BOT SLAB - MID	5.12	1.76	2	INNER BOT SLAB - LT END	1.04		
		TNT4A		1.52	50.3	1.40	1.98	1	BOT SLAB - MID	5.12	1.52	1	TOP SLAB - RT END	10.61		
		TNT6A		1.36	56.6	1.40	1.72	1	BOT SLAB - MID	5.12	1.36	1	TOP SLAB - RT END	10.61		
		TNT7A		1.39	58.4	1.40	1.66	1	BOT SLAB - MID	5.12	1.39	2	INNER BOT SLAB - LT END	1.04		
		TNT7B		1.38	58.0	1.40	1.57	1	BOT SLAB - MID	5.12	1.38	2	INNER BOT SLAB - LT END	1.04		
		TNAGRIT4		1.35	58.1	1.40	1.58	1	BOT SLAB - MID	5.12	1.35	2	INNER BOT SLAB - LT END	1.04		
		TNAGT5A		1.30	58.5	1.40	1.56	1	BOT SLAB - MID	5.12	1.30	2	INNER BOT SLAB - LT END	1.04		
		TNAGT5B		1.29	58.1	1.40	1.53	1	BOT SLAB - MID	5.12	1.29	2	INNER BOT SLAB - LT END	1.04		

LOAD FACTORS:

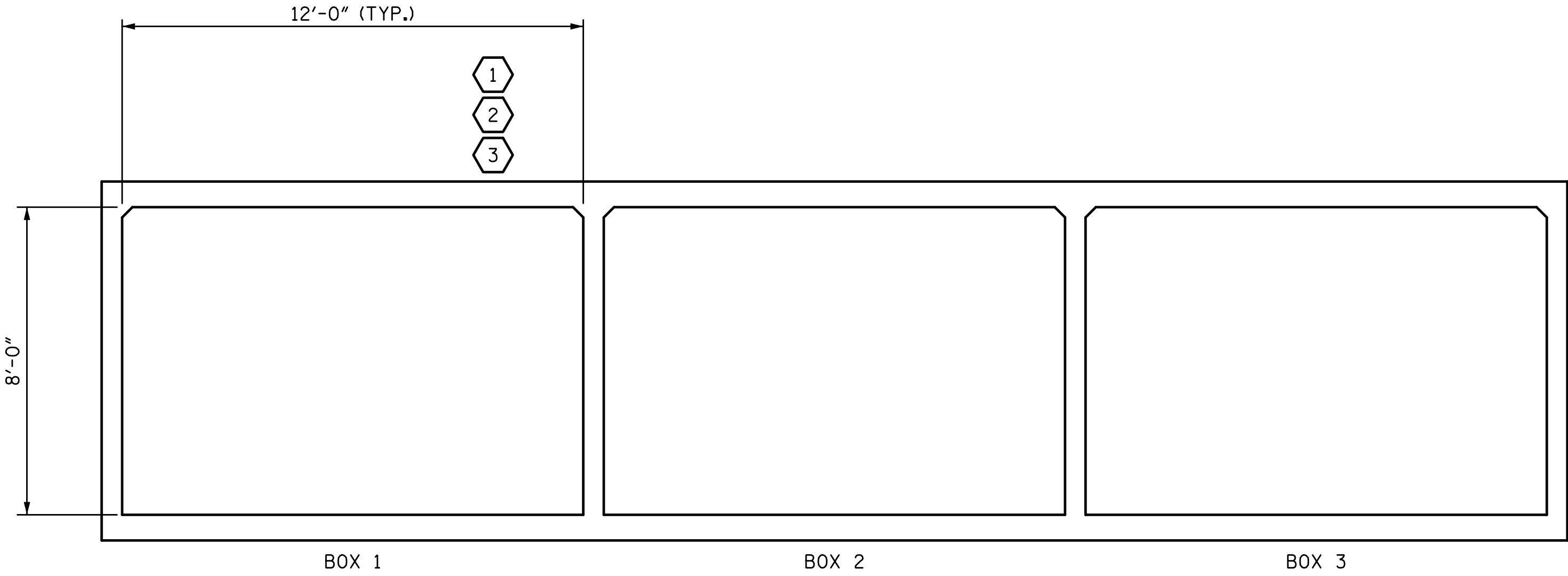
DESIGN LOAD RATING FACTORS

LOAD TYPE	MAX FACTOR	MIN FACTOR
DC	1.25	0.90
DW	1.50	0.65
EV	1.30	0.90
EH	1.35	0.90
ES	1.35	0.90
LS	1.75	--
WA	1.00	--

NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

⬡ CONTROLLING LOAD RATING
⬡1 DESIGN LOAD RATING (HL-93)
⬡2 DESIGN LOAD RATING (HS-20)
⬡3 LEGAL LOAD RATING **
** SEE CHART FOR VEHICLE TYPE



LRFR SUMMARY
(LOOKING DOWNSTREAM)

DRAWN BY: T. BANKOVICH	DATE: 8-16
CHECKED BY: B.S. COX	DATE: 8-16
DESIGN ENGINEER OF RECORD: B.S. COX	DATE: 8-16

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PROJECT NO. 44449
GUILFORD COUNTY
STATION: 16+28.50 -L-

SHEET 6 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

LRFR SUMMARY FOR
REINFORCED CONCRETE
BOX CULVERTS
(NON-INTERSTATE TRAFFIC)

REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
TOTAL SHEETS					6

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STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	- - - - -	A.A.S.H.T.O. (CURRENT)
LIVE LOAD	- - - - -	SEE PLANS
IMPACT ALLOWANCE	- - - - -	SEE A.A.S.H.T.O.
STRESS IN EXTREME FIBER OF		
STRUCTURAL STEEL - AASHTO M270 GRADE 36	-	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W	-	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	-	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION		
GRADE 60	- -	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	- - - - -	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	- - - - -	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR		
UNTREATED - EXTREME FIBER STRESS	- - - - -	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	- - - -	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	- - - - -	30 LBS. PER CU. FT.
		(MINIMUM)

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2012 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1-1/2" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 1/4" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A 1/4" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT:

ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.
ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.
IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.
DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.
WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8"Ø SHEAR STUDS FOR THE 3/4"Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8"Ø STUDS FOR 4 - 3/4"Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8"Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4"Ø STUDS BASED ON THE RATIO OF 3 - 7/8"Ø STUDS FOR 4 - 3/4"Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".
EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.
WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16 INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.
METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINIS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.